



DEFENSE LABORATORY ENTERPRISE

Report Documentation Page			Form Approved OMB No. 0704-0188		
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE JUL 2011		2. REPORT TYPE		3. DATES COVERED 00-00-2011 to 00-00-2011	
4. TITLE AND SUBTITLE Defense Laboratory Enterprise			5a. CONTRACT NUMBER		
			5b. GRANT NUMBER		
			5c. PROGRAM ELEMENT NUMBER		
6. AUTHOR(S)			5d. PROJECT NUMBER		
			5e. TASK NUMBER		
			5f. WORK UNIT NUMBER		
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) ASD(R&E) Laboratories Office, Washington, DC, 20301			8. PERFORMING ORGANIZATION REPORT NUMBER		
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)			10. SPONSOR/MONITOR'S ACRONYM(S)		
			11. SPONSOR/MONITOR'S REPORT NUMBER(S)		
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 50	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

Message from the Director

As globalization and technological change continue at ever increasing rates, the need for a strong technical base also increases for the Department of Defense (DoD). The core of this DoD technical base is the Defense Laboratory Enterprise, which provides a cadre of highly skilled scientists and engineers and the infrastructure required to remain at the forefront of technology development and awareness. Defense laboratories, operated by the, Army, Navy, and Air Force are recognized as Department assets and are a vital element of the interconnected academic and industrial base credited with keeping our military the most technologically advanced in the world.



The Defense Laboratory Enterprise is comprised of organizations across 22 states employing over 38,000 scientists and engineers performing, overseeing and participating in over \$30B of work per year. The enterprise provides world leading competencies across a broad research and development portfolio – advancing basic sciences with horizon potential, developing militarily relevant technology which transitions to industry, providing quick response and prototyping capability for emerging threats and unmatched support and focus to warfighters in any contingency.

In challenging times, a deep understanding of our complex and diverse Defense Laboratory Enterprise system and workforce is needed to ensure the Department can maintain this world class technical capability. This document provides an introduction to each laboratory, their core technical competencies and focus areas in order to provide the military community, senior leaders, and the American public with a better understanding of the potent capabilities resident therein.

It is the mission of ASD(R&E) and this office to plan and work for the long term health and viability of the Defense Laboratory Enterprise. We hope this booklet provides a thoughtful introduction to this vital national resource.

A handwritten signature in blue ink, appearing to read 'John Fischer'.

Dr. John Fischer
Director, ASD(R&E) Laboratories Office

Table of Contents

7

ARMY Laboratories

8

Aviation and Missile Research, Development, and Engineering Center (AMRDEC) Redstone Arsenal, AL

10

Army Research Institute for the Behavioral and Social Sciences (ARI) Arlington, VA

12

Army Research Laboratory (ARL) Adelphi, MD

14

Armament Research, Development and Engineering Center (ARDEC) Picatinny Arsenal, NJ

16

Communication Electronics Research, Development and Engineering Center (CERDEC) APG Aberdeen, MD

18

Edgewood Chemical Biological Center (ECBC) Aberdeen Proving Ground, MD

20

Engineer Research and Development Center (ERDC) Vicksburg, MS

22

Natick Soldier Research, Development & Engineering Center (NSRDEC) Natick, MA

24

Space and Missile Defense Technology Center (SMDTC) Huntsville, AL

26

Tank Automotive Research, Development and Engineering Center (TARDEC) Warren, MI

28

United States Army Aeromedical Research Laboratory (USAARL) Fort Rucker, AL

30

United States Army Institute of Surgical Research (USAISR) Fort Sam Houston, TX

32

United States Army Research Institute of Environmental Medicine (USARIEM) Natick, MA

34

United States Army Medical Research Institute of Chemical Defense (USAMRICD) Aberdeen Proving Ground, MD

36

United States Army Medical Research Institute of Infectious Diseases (USAMRIID) Fort Detrick, MD

38

Walter Reed Army Institute of Research (WRAIR) Silver Spring, MD

41

NAVY Laboratories

42

NAWCWD - China Lake and Point Mugu, CA

44

NAWCAD - Patuxent River Patuxent River, MD

45

NAWCAD - Training Systems Division Orlando, FL

46

NAWCAD - Lakehurst Lakehurst, NJ

47

NRL - Naval Research Laboratory Washington, D.C.

49

NSWC - Carderock Division West Bethesda, MD

51

NSWC - Corona Division Corona, CA

53

NSWC - Crane Division Crane, IN

55

NSWC - Dahlgren Division Dahlgren, VA

57

NSWC - Naval Explosive Ordnance Disposal Technology Division Indian Head, MD

59

NSWC - Indian Head Division Indian Head, MD

61

NSWC - Panama City Division Panama City, FL

63

NSWC - Port Hueneme Division Port Hueneme, CA

65

NUWC - Newport Division Newport, RI

67

NUWC - Keyport Division Keyport, WA

68

SPAWAR - Systems Center Pacific San Diego, CA

70

SPAWAR - Systems Center Atlantic Charleston, SC

73

AIR FORCE Laboratories

74

Headquarters Air Force Research Laboratory (HQ-AFRL) Arlington, VA

76

AFRL - Air Force Office of Scientific Research (AFOSR) Arlington, VA

78

AFRL - Air Vehicles (RB) Wright Patterson AFB, OH

80

AFRL - Directed Energy (RD) Kirtland AFB, NM

82

AFRL - Human Performance Wing (RH) Wright-Patterson AFB, OH

84

AFRL - Information (RI) Rome, NY

86

AFRL - Space Vehicles (RV) Kirtland AFB, NM

88

AFRL - Munitions (RW) Eglin AFB, FL

90

AFRL - Materials and Manufacturing (RX) Wright Patterson AFB, OH

92

AFRL - Sensors (RY) Wright-Patterson AFB, OH

94

AFRL - Propulsion (RZ) Wright-Patterson AFB, OH



ARMY LABORATORIES





Aviation and Missile Research, Development, and Engineering Center (AMRDEC) Redstone Arsenal, AL

Mission

To plan, manage and conduct research, exploratory and advanced development in order to transform the future force. Additionally, AMRDEC provides one-stop life cycle engineering, technical and scientific support for aviation and missile weapons systems and their support systems, unmanned systems and all other assigned systems, programs, and projects in order to equip the warfighter with the best technology.

Brief History of the Center

The genesis of the Aviation and Missile Research, and Development, Engineering Center (AMRDEC) can be traced to October 1948 when the Chief of Ordnance designated Redstone Arsenal as the center for research and development in the field of rockets. On 28 October 1949, the Secretary of the Army approved the transfer of the Ordnance Research and Development Division Sub-Office (Rocket) at Fort Bliss, Texas, to Redstone Arsenal.

In July 1960, research and development activities by the Army at Redstone turned to integrating space-age technology into weapons for the soldier in the field. When the US Army Missile Command (MICOM) was activated on 1 August 1962, the Directorate of Research and Development was established as one of its primary organizational elements.

The R&E Directorate was redesignated the Directorate for Research, Development, Engineering, and Missile Systems Laboratory (RDE&MSL) effective 4 January 1971. This laboratory, in turn, became the Army Missile Research, Development, and Engineering Laboratory (MRDEL) effective 1 October 1972. With the establishment of the US Army Missile Research and Development Command (MIRADCOM) on 31 January 1977, the Technology Laboratory and the Engineering Laboratory were born.

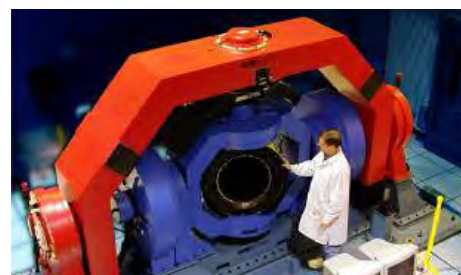
In May 1985, AML changed its name to the Research, Development, and Engineering Center (RDEC) in compliance with AMC directions to establish research, development, and engineering (RD&E) centers to serve as technical centers of excellence and to assure maximum return from resources devoted to RD&E efforts. The establishment of the US Army Aviation and Missile Command (AMCOM) on 17 July 1997 created the need for two RDECs under the auspices of this command: the Aviation RDEC (AVRDEC) and the Missile RDEC (MRDEC). In March 1999 MRDEC was reorganized as the AMCOM RDEC; the AVRDEC was discontinued and merged with the AMCOM RDEC. In 2004 the AMRDEC was assigned under the new US Army Research, Development and Engineering Command (RDECOM).

Recent/Historical Technical Milestones

- Exploitation of the discovery of transparent metals: For the thermal, radio frequency and laser shielding of the warfighter.
- Demonstrated 1st Hunter Standoff-Killer Team (HSKT): It allows crew to remain well outside the threat's lethal range.
- Predator/HELLFIRE Weaponization: An unmanned aerial vehicle that can locate, identify, and destroy specific targets.
- Guided Multiple Launch Rocket System (GMLRS): It increases survivability of the platform and reduces potential for fratricide.
- RECCE-1 Vehicle (Reconnaissance Vehicle): Developed in just 90 days.



Firing of GMLRS



Missile Component Simulation in Real-world EM Environments – Infrared, Millimeter Wave and Multi-spectral

Core Technical Competencies

Manned and unmanned aviation and missile technologies and systems

- Aerodynamics & aeromechanics
- Aided and automatic target recognition
- Composites and structural design and analysis
- Guidance, control and navigation
- Hypersonics
- Propulsion and drive systems

Aviation and missile technologies systems engineering and integration in:

- Avionics
- Hardware-in-the loop modeling and simulation
- Human/systems interface
- Weapons and platforms

Missile, aviation and weapon systems support through:

- Software development and interoperability
- Special operations & rapid prototyping
- Life cycle and systems engineering
- Airworthiness and safety of flight releases



Aviation and Missile Research, Development, and Engineering Center (AMRDEC) Redstone Arsenal, AL

Major Locations

AMRDEC's Headquarters, Redstone Arsenal, AL

This Directorate specializes in aerospace, aviation, engineering, and missile scientific and technical material. AMRDEC conducts operations in approximately 1.7 million square feet of facilities at Redstone Arsenal to include test ranges and facilities managed by the Redstone Technical Test Center (RTTC), and support for the FBI's Hazardous Devices School and the Redstone Arsenal Airfield.

Aeroflight Dynamics Directorate (AFDD), Moffett Field, CA

This Directorate advances knowledge and innovative technology in rotorcraft aeromechanics and human-system integration, providing a decisive advantage for Allied forces in Aviation mission worldwide and enhancing US rotorcraft competitiveness.

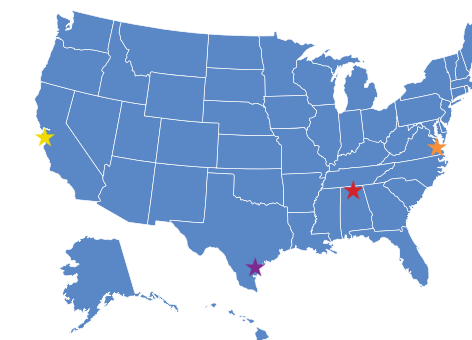
Aviation Applied Technology Directorate (AATD), Ft. Eustis, VA

A staff of Government and contractor personnel provide aircraft maintenance and training for the Army's AH-64, AH-1, UH-60A/L, OH-58D, UH-1 helicopters as well as the C-12 fixed-wing aircraft. The Flight Projects Office provides instrumentation for flight tests of prototype weapons systems using a vast array of airborne sensors, transducers, signal conditioning and encoding devices, solid state recorders, telemetry transmitters, telemetry receivers, and decoders.

Aviation and Engineering Directorate (AED), Corpus Christi, TX

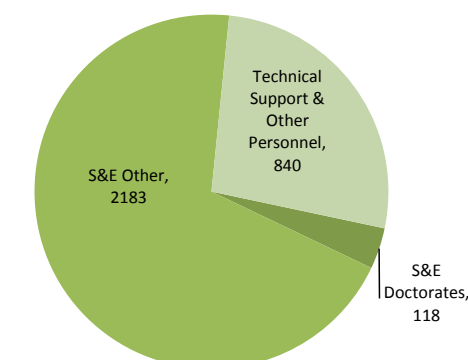
The mission of the AED is to research and develop systems engineering to contribute to part acquisition quality control that will maintain and enhance critical safety and air worthiness. The field teams provide worldwide on-site maintenance services, saving a considerable amount of time and money, and overhaul, repair, modification, recapitalization, retrofit, testing and modernization of helicopters, engines and components for all service and foreign military sales.

AMRDEC Sites

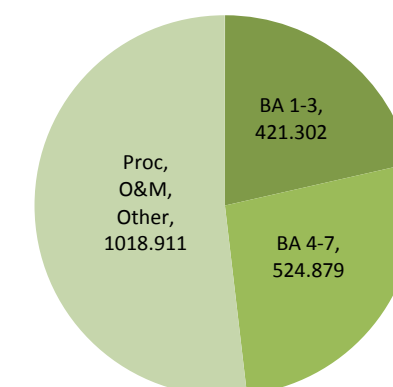


- ★ Redstone Arsenal, Alabama
- ★ Moffett Field, California
- ★ Fort Eustis, Virginia
- ★ Corpus Christi, Texas

Human Capital 2010 (total Number)



Budget FY09 (\$ Millions)



Contact Information

For additional information, visit the AMRDEC's website at <http://www.redstone.army.mil/amrdec/> or contact Mervin Brokke at 256-313-5747 or by email at Mervin.brokke@us.army.mil





Army Research Institute for the Behavioral and Social Sciences (ARI) Arlington, VA

Mission

To maximize personnel readiness and combat effectiveness through advances in the behavioral and social sciences focused on personnel, training, and leader development. ARI provides the scientific foundation for effective and efficient selection, assignment, career advancement, training and leadership that result in improved individual and unit performance.

Brief History of the Institute

A meeting of experimental psychologists at Harvard University led to the Secretary of War establishing the Committee on Classification of Personnel in the Army in August of 1917. To meet the manpower requirements for World War I, research was conducted to develop a selection and classification system, including occupation tests, performance trade tests, the soldier's qualification card, and trade and personnel specifications for enlisted men and officers. In 1939, the Personnel Research Section was created as an Advisory Committee to the Classification of Military Personnel, which was later renamed the U.S. Army Personnel Research Office, the direct ancestor of ARI.

During the post World War II era, ARI expanded its behavioral research into areas such as training, human engineering, social psychology, and physiological psychology. Recruiting and retention research were major research concentrations of ARI. Soon after, Army leaders looked to ARI for research in developing new techniques for collective training in the field, designing realistic ways of training while fighting, forging cohesive and committed units, and developing integrated leadership systems at all levels.

Today, ARI organizes its efforts along three broad lines of research: personnel, leader development and training. Through this research, ARI continues to help the Army meet its human resource needs as it transforms to meet the challenges of new and more complex missions and battlefield environments of the future.

Recent/Historical Technical Milestones

- Tailored Adaptive Personality Assessment System: It combines modern psychometric methods, computing technology, and research findings for personnel selection.
- END STATE: Commander's Visualization and the Battalion Level (training product and training methodology).
- Foundations for Intercultural Adaptability in the Warfighter: Indicators lead to performance improvement.



Highly mobile forces training with new technologies to enhance responsiveness and adaptability



Assessing performance measures for 21st century soldier

Core Technical Competencies

- Digital command staff
- Impact of semi-automated, digital and robotic systems
- Leader development
- Organization effectiveness
- Personnel issues
- Recruitment screening
- Simulation-based training
- Soldier management and attitude assessment
- Soldier performance metrics
- Soldier promotion procedures
- Soldier training
- Sustaining complex task performance
- Web-based distributed learning

Army Research Institute for the Behavioral and Social Sciences (ARI) Arlington, VA



Major Locations

ARI Headquarters, Arlington, VA

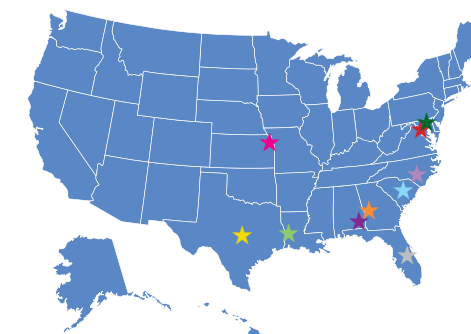
Headquarters will relocate to Fort Belvoir, Virginia, in FY11. This site has overall responsibility for attitude and opinion surveys, personnel assessment, basic research and occupational analysis

Additional Locations

The sites below make the ARI the lead laboratory for training, leader development, and soldier research and development center of excellence for army personnel, surveys, and occupational analysis:

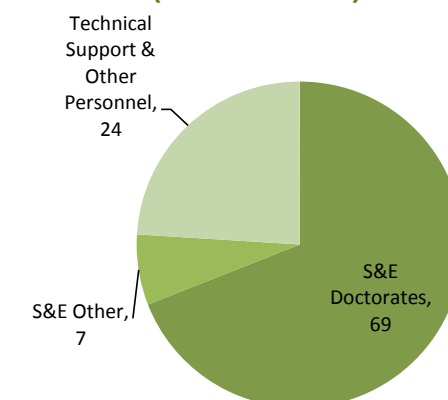
- Operational Unit Training, Ft. Hood, TX
- Institutional Training, Ft. Benning, GA; Ft. Rucker, AL; Ft. Polk, LA, and Ft. Jackson SC
- Leader Development, Ft. Leavenworth, KS
- Special Forces, Ft. Bragg, NC
- Technology Based Training, Orlando, FL
- Organizational Performance, Aberdeen Proving Ground Research Element, MD

ARI Sites

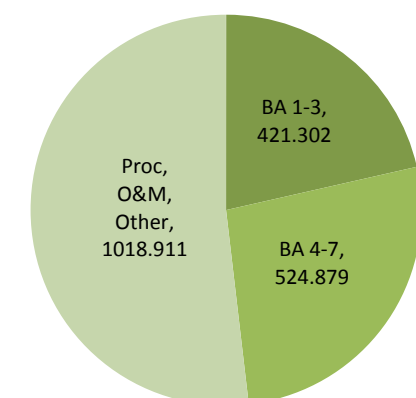


- ★ Arlington, Virginia
- ★ Fort Hood, Texas
- ★ Fort Benning, Georgia
- ★ Fort Rucker, Alabama
- ★ Fort Polk, Louisiana
- ★ Fort Jackson, South Carolina
- ★ Fort Leavenworth, Kansas
- ★ Fort Bragg, North Carolina
- ★ Orlando, Florida
- ★ Aberdeen Proving Ground, Maryland

Human Capital 2010 (total Number)



Budget FY09 (\$ Millions)



Contact Information

For additional information, visit the ARI's website at <http://www.hqda.army.mil/ari/> or contact Major Timothy Beninato at 703-692-1281, or by email, Timothy.Beninato@us.army.mil





Army Research Laboratory (ARL)

Adelphi, MD

Mission

To provide innovative science, technology, and analyses that enable full spectrum operations. ARL is the bridge between the scientific and technical community and the Army. It has been recognized for scientific, technical and analytical excellence and it is a leader in providing innovative solutions for the current and future Army.

Brief History of the Laboratories

In October 1992, the US Army Research Laboratory (ARL) was activated, growing out of the Base Realignment and Closure (BRAC) process, the LAB 21 study, and other evaluations. The new lab consolidated the seven corporate labs of the Laboratory Command (LABCOM) with other Army research elements to form a centralized laboratory concentrating on scientific research, technology development, and analysis.

For more than 50 years, in laboratories belonging to the Army Materiel Command (AMC) and their antecedents in the Technical Corps, civilians have conducted the great majority of the Army's basic science programs, whether as in-house scientists and engineers or as contractors in private industry and academia. These civilians helped develop the proximity fuze; worked to develop ENIAC (Electronic Numerical Integrator and Computer), the first operational, general purpose, electronic digital computer; grew some of the first synthetic large quartz crystals; and developed the titanium alloy T1-6A1-4V. Concentrating in its core skill areas, ARL has always reached out to "partner" with leading researchers in industry and academia, while simultaneously working with the active Army to ensure that programs produce advanced technologies that support soldiers in the field today and in the future.

Looking towards the future, ARL scientists and engineers are pioneering research in such areas as information distribution and management technologies; human cognitive and sensory capabilities; simulation and virtual environments; nanoscale electro/optoelectronic devices; teleoperations; composites and ceramics; ultra-wide-band radar; and lightweight, rechargeable power sources. ARL illustrates both the technical capability of the Army's scientists and engineers, as well as the value of technological interchange between and among the military, academia, and private industry.

National defense is one of the most critical duties performed by the federal government for the American people. Cutting-edge technology research and development offer incredible potential to improve the Army's chances of surviving and winning any future conflicts. ARL, as the Army's corporate or central laboratory for combat materiel, will play a constructive, key role in the national defense as it executes its strategies to take full advantage of the exciting opportunities that lie ahead.

Recent/Historical Technical Milestones

- Laser Cooling of Molecules: This could enable revolutionary new capabilities in sensors and computers and open the door to powerful new areas in basic research and DoD applications.
- Video Microscopy of Living Cells: This technology uses a unique, real-time microscopy method for investigating the mechanisms of action of various antibacterial compounds.



Microautonomous Systems



Electromagnetic Vulnerability Assessment Facility

Core Technical Competencies

- Advanced Computing & Computational Sciences
- Advanced Weapons Concepts
- Ballistic Vulnerability/Lethality (V/L)
- Computing Sciences
- Electronic Warfare (EW)
- Energetic Materials and Propulsion
- Human Robotic Interaction
- Information Assurance/Computer Network Defense (IA/CND)
- Network Sciences
- Neuroergonomics
- Non-Imaging Technologies
- Projectiles, Warheads and Scalable Effects
- Radio Frequency (RF) Technologies
- Thermal Management
- Vehicle Propulsion and Protection



Army Research Laboratory (ARL)

Adelphi, MD



Recent/Historical Technical Milestones cont.

- Quantum Imaging Information Science and Technology (QUIST): It has exploited the quantum ghost imaging (QGI) phenomena for a new generation of high-resolution battlefield imaging.
- Nanostructured Materials Research: ARL-ARO sponsored basic research discoveries in catalysis and nanomaterials at Kansas State University led to the creation of NanoScale Corporation.
- New Numerical Techniques in Chemical Kinetics: This facilitated the reduction of grid points for droplet interaction model for future rocket motor design.

Major Locations

ARL Headquarters, Adelphi, MD

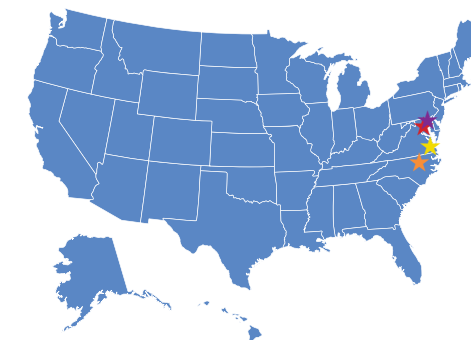
ARL applies the extensive research and analysis tools developed in its direct mission program to support ongoing development and acquisition programs in the Army Research, Development, and Engineering Centers (RDECs), Program Executive Offices (PEOs)/Program Manager (PM) Offices, and Industry. ARL has consistently provided the enabling technologies in many of the Army's most important weapons systems.

Additional Locations

The sites below make the ARL the largest source of world-class integrated research and analysis in the Army:

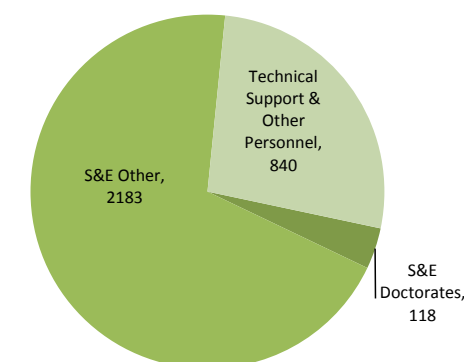
- Vehicle Technology Directorate, Hampton, VA
- Army Research Office, Triangle Park, NC
- Human and Engineering Research Directorate, Weapons Materials and Research Directorate, and Survivability Lethality Analysis Directorate, all located in Aberdeen Proving Ground, MD

ARL Sites

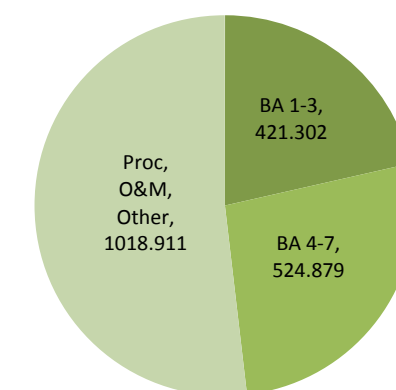


- ★ Adelphi, Maryland
- ★ Hampton, Virginia
- ★ Triangle Park, North Carolina
- ★ Aberdeen Proving Ground, Maryland

Human Capital 2010 (total Number)



Budget FY09 (\$ Millions)



Contact Information

For additional information, visit the ARL's website at <http://www.arl.army.mil/www/default.cfm> or contact Tom Moyer at Thomas.moyer@us.army.mil or by phone, 301-394-4295.





Armament Research, Development and Engineering Center (ARDEC) Picatinny Arsenal, NJ

Mission

To develop and maintain a customer focused, world-class workforce that will execute, manage and continuously improve integrated life cycle engineering processes required for the research, development, production, field support and demilitarization of munitions, weapons and fire control. ARDEC's workforce provides Product Life Cycle support for 90% of the Army's lethality used every day by the warfighter. The ARDEC workforce and the network of partners have no single counterpart in the world. Their collective goal is to continue being the world-recognized leader in cutting-edge armament technology solutions that save soldiers' lives.

Brief History of the Center

In 1977, the government created the US Army Armament Research and Development Center (ARRADCOM) to take charge of creating new and improving old weapons and munitions. Headquarters of the new command was on the site of the former Picatinny Arsenal in north central New Jersey. In 1983, the Army disestablished ARRADCOM and placed its mission under its Armament, Munitions and Chemical Command (AMCCOM) at Rock Island Arsenal in Illinois. However, the bulk of weapons and munitions research and development remained at the Picatinny site, now called the US Army Armament Research and Development Center (ARDC). In 1986, the Army ordered all its R&D centers to recognize an important aspect of their work with a name change, and ARDC became ARDEC, the U.S. Army Armament Research, Development and Engineering Center.

ARDEC has been repeatedly recognized by its customers for innovation and support to the Soldier dominating the US Army's 10 Greatest Inventions of the Year Award (the Soldier's Awards) and designated as Army's benchmark for Technology Transition by the Army Audit Agency. In addition, ARDEC has emulated the successes at 3M, Motorola and GE based on the deployment of Lean Six Sigma and concepts of Lean across the organization. As a result of this improvement work, ARDEC became the first Federal Organization to receive the nation's highest Presidential honor - the 2007 Malcolm Baldrige Quality Award (Non-Profit) - and Capability Maturity Model Integration (CMMI) Level 5 for its in-depth external review of its business processes, becoming the only DoD organization currently at the highest CMMI Level.

Recent/Historical Technical Milestones

- Insensitive Munitions in Science & Technology and ManTech programs.
- Objective Gunner Protection Kit(s): A new armor shield that provides much needed protection for Humvee gunners in combat situations.
- Common Remotely Operated Weapons Stations (CROWS) Lightning: With day/night capability to identify and defeat targets out to maximize effective range of weapons on the move.
- Projectile Detection and Cueing (PD Cue).
- XM982 Excalibur Precision Guided Extended Range Artillery Projectile.



CROWS Lightning



Objective Gunner Protection Kit

Core Technical Competencies

- Acoustic Sensors/CIED
- Advanced Energy
- Ammo/Munition Integration
- Ammunition Logistics
- Cannons/Gun Tubes/Recoil Management
- Counter Rockets, Artillery and Mortars (C-RAM)
- Energetics/Pyro/Propulsion
- Explosive Ordnance Disposal Research
- Fire Control/Software Systems
- Fuze & Power
- Integrated Weapons/Feed Systems
- Nano Technologies
- Non-Lethal Weapons
- Precision Guidance
- Warheads



Armament Research, Development and Engineering Center (ARDEC) Picatinny Arsenal, NJ

Major Locations

ARDEC Headquarters, Picatinny, NJ

ARDEC provides armaments research, development and engineering for a broad spectrum of armaments technologies and products used by US forces and its Coalition allies, as well as domestic law enforcement agencies. These include small, medium and large caliber weapons, guidance systems, explosives, warheads, propellants, ammunition and related support systems.

Benet Lab, Watervliet Arsenal, NY

Benet Laboratories performs technology, design, development, engineering and production & field support for large caliber armament systems, to include: cannon, mortars and recoilless rifles; tank gun mounts and recoil mechanisms and munitions handling systems.

Aberdeen Proving Ground, Aberdeen, MD

This site is responsible for the development of aiming data and ballistic fire control information and software (NATO Armaments Ballistics Kernel) for all unguided and certain guided combat weapons in the U.S. Army inventory, select tri-service systems, and select foreign military sales cases. This includes small caliber infantry systems, mortars, tank fired munitions, artillery, missiles, and rockets. NATO and multinational standardization agreements are developed for interior and exterior ballistic simulation models, ballistic algorithms, firing table elements, and fire control methodology.

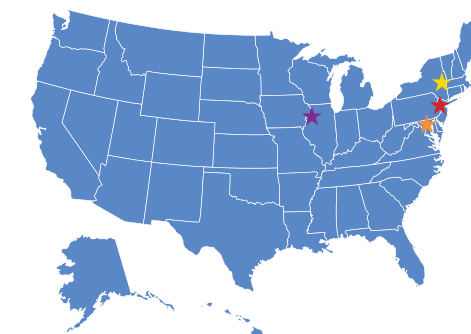
Production and Field Support Team, Rock Island, IL

Engineering team located at Rock Island executes and manages life cycle engineering processes required for the items in production to include field support and demilitarization of ammunition, weapons fire control and associated items

Contact Information

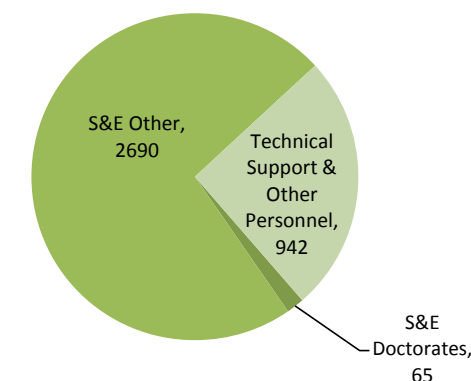
For additional information, visit the ARDEC's website at <http://www.pica.army.mil/PicatinnyPublic/organizations/ardec/index.asp> or contact the Picatinny Public Affairs Office at 973-724-6366 (DSN: 880-6366) or by email, Pica.PublicAffairs@conus.army.mil

ARDEC Sites

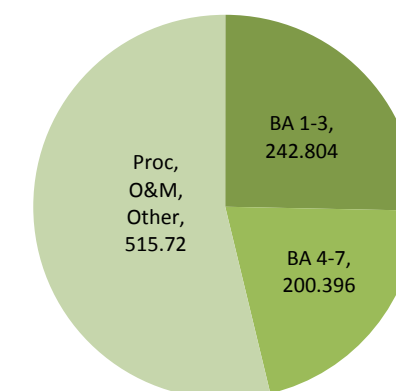


- ★ Picatinny, New Jersey
- ★ Watervliet Arsenal, New York
- ★ Aberdeen Proving Ground, Maryland
- ★ Rock Island, Illinois

Human Capital 2010 (total Number)



Budget FY09 (\$ Millions)





Communication Electronics Research, Development and Engineering Center (CERDEC) APG Aberdeen, MD

Mission

To develop and integrate command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) technologies that enable information dominance and decisive lethality for the networked warfighter.

Brief History of the Center

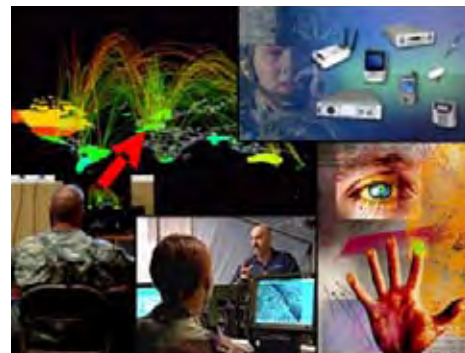
The Communications-Electronics Research, Development and Engineering Center (CERDEC) is a subordinate element of the US Army Research, Development and Engineering Command (RDECOM). Its history traces back to the days of World War I in Dec 1917 when Camp Alfred Vail was established at the location what is now known as Fort Monmouth, NJ. Initial research performed in the laboratory was directed in the development of radio equipment. In the 1930s, the Signal Corp laboratories were consolidated at Ft. Monmouth.

After WWII, the development of the Diana Radar became the pre-cursor of today's satellite communications. The next decades established the platform for radars and other surveillance equipment - used during Vietnam - and the Starlight scopes - which evolved into today's Night Vision goggles giving US Soldiers the ability to "Own the Night."

The focus in the 1990's was battlefield digitization which integrated Army's systems and brought them into the information age. Today, CERDEC's scientist and engineers work to facilitate, convey, protect, and extract actionable information to enable soldiers to deduce what can be known from his environment to the best decisions. Whether by assuring communications, enabling connectivity, extracting intelligence, extending reach, sensing the space or informing and influencing the fight, CERDEC ensures soldiers are better informed before they act.

Recent/Historical Technical Milestones

- Husky Mounted Detection System (HMDS): A counter-Improvised Explosive Device (IED)/counter-mine system that provides the warfighter to detect IEDs and anti-tank (AT) mines.
- WOLFHOUD: A ruggedized, man-packable Radio Frequency (RF) Direction-Finding (DF) system with a handheld display.
- Counter-RCIED Electronic Warfare (CREW) DUKE V3: It provides advanced EW subsystems to counter emerging advanced RCIED technologies that cannot be countered by any current Counter-RCIED system.
- Universal Collaboration Bridge (UCB): A software architecture that provides interoperability between different deployed chat systems.
- Rucksack Enhanced Portable Power System (REPPS) Kit: It uses a foldable, anti-glint 65 watt solar panel and connectors to convert energy from the sun into power.



Battle Command Technology Lab



Husky Mounted Detection System

Core Technical Competencies

- Combat ID
- Cyberspace Operations (Offensive)
- Electronic Warfare
- IED/Mine and Minefield Detection and Defeat
- Intelligence Fusion and Surveillance
- Mission Command
- Network Enterprise Management
- Reconnaissance, Targeting
- Soldier Sensors
- Solider & Mobile Power
- Tactical Mobile Communications & Networking: Systems Engineering & Integration



Communication Electronics Research, Development and Engineering Center (CERDEC) APG Aberdeen, MD

Major Locations

CERDEC Headquarters, APG Aberdeen MD

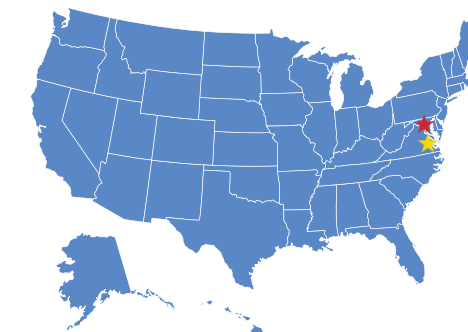
Much of the Army's research and development of hi-tech systems - communications, computers, intelligence and C4ISR systems - is done at APG Aberdeen by members of the Team C4ISR. This site creates the synergies that allow rapid prototyping, fielding and modernization of systems that save lives on the battlefield. The post's location in high-tech New Jersey provides ready access to the premier institutions in academia and industry and a skilled workforce to develop the most advanced warfighting systems.

Fort Belvoir, VA

The 8,600-acre post is one of the larger installations in the Military District of Washington. This installation has the singular mission of providing both logistical and administrative support for CERDEC.

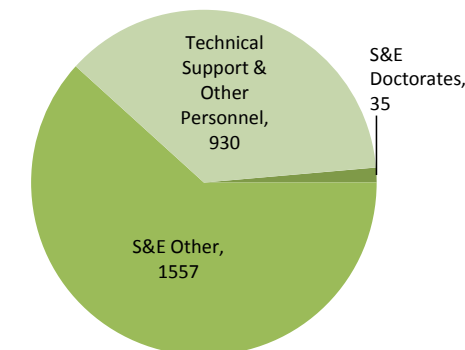
Under the 2005 BRAC law, CERDEC will finalize its transition to new facilities at Aberdeen Proving Ground, MD by Sep 2011.

CERDEC Sites

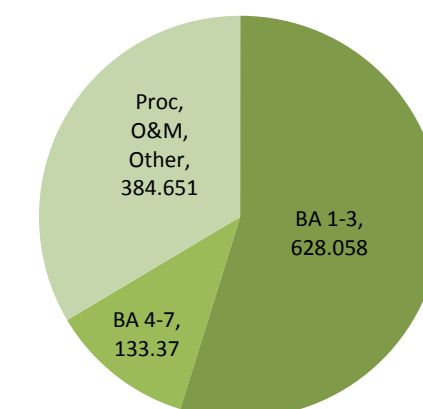


- ★ Aberdeen Proving Ground, Maryland
- ★ Fort Belvoir, Virginia

Human Capital 2010 (total Number)



Budget FY09 (\$ Millions)



Contact Information

For additional information, visit the CERDEC's website at <http://www.cerdec.army.mil/> or email the CERDEC Public Affairs Office at monm-cerdecpaao@conus.army.mil





Edgewood Chemical Biological Center (ECBC)

Aberdeen Proving Ground, MD

Mission

To provide life-cycle scientific, engineering and operational solutions to counter chemical, biological, radiological, nuclear and high-yield explosive (CBRNE) threats to US forces and the nation. ECBC is the nation's principal research and development resource for non-medical chemical and biological (CB) defense. As a critical national asset in the CB defense community, ECBC supports all phases of the acquisition life-cycle from basic and applied research through technology development, engineering design, equipment evaluation, product support, sustainment, field operations and demilitarization to address its customers' unique requirements.

Brief History of the Center

ECBC's science and technology expertise has protected the United States from the threat of chemical weapons since 1917 when President Woodrow Wilson issued a proclamation that designated Gunpowder Neck, MD., as the site for the first chemical shell filling plant in the United States. Since that time, the Center has expanded its mission to include biological materials and emerges today as the nation's premier authority on chemical and biological defense.

ECBC has an outstanding history of developing technologies in the areas of detection, protection, and decontamination. The Center's reputation and track record have produced invaluable relationships with other federal agencies and earned it a spot as a key organization within the DoD's Chemical Biological Defense Program (CBDP), which manages national defense strategies and ensures that military operations are unconstrained by chemical, biological, radiological, nuclear and explosives (CBRNE) effects. As a fee-for-service government organization, ECBC continues to evolve its mission and vision to best support stakeholders' requirements.

Recent/Historical Technical Milestones

- Port Warning and Reporting for Contamination Avoidance at Seaports of Debarkation (CASPOD): an integrated hardware and software network that provides commanders situational awareness.
- Advances in Standoff Detection: To allow warfighters to conduct integrated chemical and biological detection and identification from standoff distances.
- New Detection Requirements for Residual Levels of VX and Related Biomarkers Information: This, in turn, will be used for developing new risk guidelines for warfighter operations.
- Revolutionary Approaches to Decontamination and Hazard Determination:
 - Decontamination Testing Paradigm Shift.
 - Innovative Test Methodology for the Assessment of Vapor Hazards.



Advanced Chemistry Laboratory



McNamara Life Sciences Building



Bio Engineering Laboratory



Frequency Agile LIDAR (FAL)

Core Technical Competencies

- CB Agent Spectroscopy/Algorithm Development
- Inhalation Toxicology
- Aerosol Physics
- Filtration Sciences
- OPCW Laboratory
- NTA Science/Technology & Testing
- Single Small-Scale Facility
- CB Agent Handling and Surety
- Chemical Munitions Field Operations
- Life cycle CB Materiel Acquisition
- CB Concept Through Sustainment Solutions
- Full-Service CB Testing
- Chemistry and Bioscience of CB Warfare



Edgewood Chemical Biological Center (ECBC)

Aberdeen Proving Ground, MD

Major Locations

ECBC Headquarters, Aberdeen Proving Ground (APG), MD; Pine Bluff, AK; and Rock Island, IL.

APG is the home to three organizations: US Army Communications-Electronics Command; the U.S. Army Communications-Electronics Research, Development and Engineering Center; and the Army Contracting Command- APG (C4ISR or the Center for Excellence). Together, these organizations develop, acquire, provide, field and sustain systems and battle command capabilities for the joint warfighter with the intent to position functional areas, or 'domains', together to better track products through their entire lifecycles, from concept to combat.

Pine Bluff Arsenal (PBA), AK

PBA plays a role in the Army Force Integration Process and has direct involvement in various phases of the Life Cycle Systems Management Model: from engineering and manufacturing through operation and support. It produces, stores and demilitarizes conventional ammunition; serves as the Group Technology Center for illuminating and infrared munitions; serves as the Specified Mission Facility for smoke munitions and maintains the sole U. S. capability for white phosphorus fill. PBA supports the storage and destruction of the second largest stateside chemical weapons stockpile and enforcement of international treaty efforts through compliance, and education of worldwide inspectors.

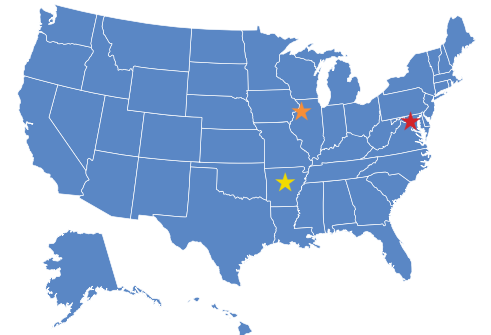
Rock Island Arsenal (RIA), IL

The Arsenal is an active US Army factory, which manufactures ordnance and equipment for the Armed Forces. Noted for its expertise in the manufacture of weapons and weapon components, every phase of development and production is available from prototype to full-scale production of major items, spare parts, and repair items. Rock Island Arsenal, known world-wide as a leader in excellence, provides essential production capability for artillery/gun mounts, equipment integration, spare parts, and other equipment for the Armed Forces, as well as the assembly of tools, sets, kits and outfits that support equipment in the field. Through new business avenues, the Arsenal can also partner with some non-military entities to assist and advance manufacturing technologies in the private sector.

Contact Information

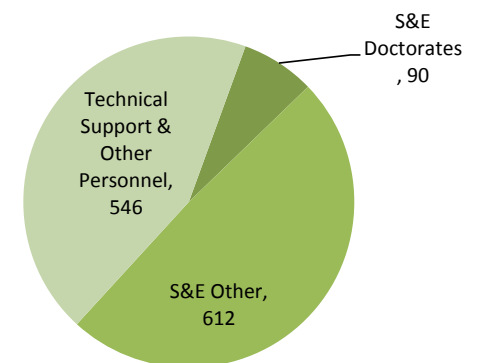
For general inquiries about the Center or to reach the Public Affairs Office, by phone 410- 436-7118, or by emailing Don Kennedy at don.kennedy@us.army.mil

ECBC Sites

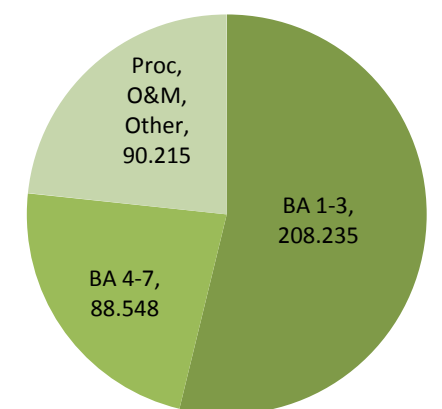


- ★ Aberdeen Proving Ground, Maryland
- ★ Pine Bluff Arsenal, Arkansas
- ★ Rock Island Arsenal, Illinois

Human Capital 2010 (total Number)



Budget FY09 (\$ Millions)





Engineer Research and Development Center (ERDC) Vicksburg, MS

Mission

The U.S. Army Engineer Research and Development Center (ERDC) provides quality, responsive engineering and environmental research and development (R&D) support to the Army and the Nation. As part of the Corps of Engineers team, ERDC develops and applies innovative science and technology solutions to support the warfighter, infrastructure, environment, water resources, and disaster operations. The ERDC provides support to the total Army engineer effort through its Military and Civil Works R&D Programs.

Brief History of the Center

The U.S. Army Corps of Engineers has been consolidating the Corps' research laboratories into the U.S. Army Engineer Research and Development Center (ERDC).

Reorganization began in October 1998 and became a reality in October 1999 when the separate laboratories combined into the ERDC.

Seven laboratories are located in four geographic sites around the country:

- Coastal and Hydraulics
- Environmental
- Geotechnical Structures
- Information Technology
- Construction Engineering Research
- Cold Regions Research and Engineering
- Topographic Engineering Center

By consolidating the labs into one R&D organization, ERDC offers its customers one door to diverse initiatives and capabilities. Integrated teams of engineers and scientists across ERDC can address a broad range of science and technology issues, from Arctic temperatures to vehicle mobility in desert sands; from protecting a wetland to protecting U.S. troops around the globe; from pinpointing the exact location of an artillery round to predicting the extended habitat range of an endangered species.

Recent/Historical Technical Milestones

- The Discrete Element Method (DEM).
- Tunnel Detection Technologies.
- Modular Protective System.
- Battlespace Terrain Reasoning and Awareness.
- Carbon Nanotube Technology for Military Engineering.



Tunnel Detection System



Dr. Rick Olsen and Gerardo Velasquez, GSL, provided guidance on bridge placement and soil stabilization to Navy SEABEES in the weeks leading up to Operation Iraqi Freedom

Core Technical Competencies

- Geospatial Infostructure and Framework
- Imagery and geoData Sciences
- Terrain Analysis for Signal and Signature Phenomenology
- Geospatial Reasoning
- Geo-Enabled Battle Command
- Adaptive Protection
- Scalable Weapon Effects
- Near Surface Effects
- Military Materials in the Environment
- Adaptive and Resilient Installations
- Sustainable Ranges and Lands

Engineer Research and Development Center (ERDC) Vicksburg, MS



Major Locations

ERDC headquarters is located in Vicksburg, Mississippi.

Additional division sites in Vicksburg are the Coastal and Hydraulics, Environmental, Geotechnical and Structures, and Information Technology Laboratories, the Construction Engineering Research Laboratory in Champaign, Illinois, the Cold Regions Research and Engineering Laboratory in Hanover, New Hampshire, and the Topographic Engineering Center in Alexandria, Virginia.

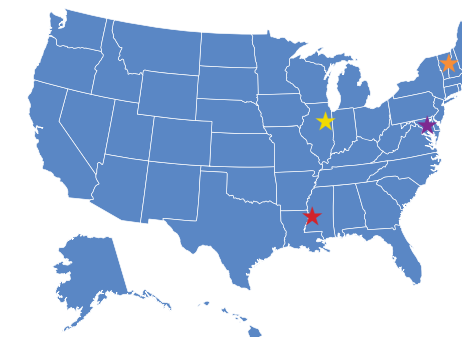


Team members of the ERDC Geotechnical and Structures Laboratory are leading an effort to develop physical protective measures that keep U.S. warfighters safer



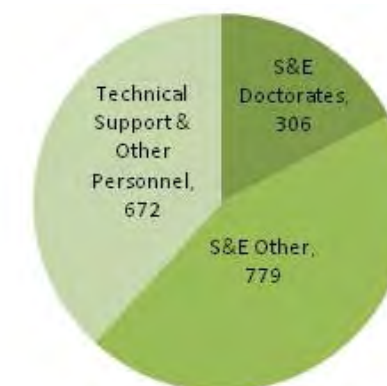
Defeat of Armor-Piercing Rocket-Propelled Grenades

ERDC Sites

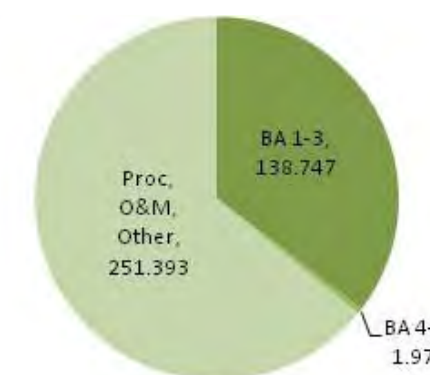


- ★ Vicksburg, Mississippi
- ★ Champaign, Illinois
- ★ Hanover, New Hampshire
- ★ Alexandria, Virginia

Human Capital 2010 (total Number)



Budget FY09 (\$ Millions)



Contact Information

Name: Ms. Deborah Quimby, Public Affairs Officer
Phone: 601-634-3188 / Toll-Free 866-ERDC-USA
Email: Deborah.h.quimby@usace.army.mil





Natick Soldier Research, Development & Engineering Center (NSRDEC) Natick, MA

Mission

To maximize the warfighter's survivability, sustainability, mobility, combat effectiveness and quality of life by treating the warfighter as a system.

Brief History of the Center

In 1949, Congress authorized construction of a research facility that would concentrate on the needs of the Soldier. By 1951, the Army announced that the \$11 million facility would be built in the town of Natick, MA, because of its proximity to industrial facilities and academic institutions. This new facility was officially opened in 1954 and titled the Quartermaster Research and Development Center. Over time the installation has gone through many name changes. Today, as the only active Army Installation remaining in New England, the site is officially known as the Natick Soldier Systems Center (NSSC). The NSSC is comprised of several tenant organizations including the largest, the Natick Soldier Research, Development and Engineering Center (NSRDEC), informally known as Natick Labs, or simply Natick.

In the beginning, Natick pioneered innovations in the areas of protective clothing and equipment and combat feeding. This resulted in body armor and helmets with improved protection, footwear with improved comfort and effectiveness, and new ration items offering nutritionally balanced meals. The Vietnam War through the end of the Cold War and the Gulf War marked exceptional Natick achievements in the protection, sustainment and enhancement of Warfighters. Some accomplishments include state-of-the-art lightweight body armor, flame-retardant clothing, fungi-protective boots, a new family of personal parachutes, a new camouflage pattern designed specifically for the deserts of Kuwait and Iraq, a flameless ration heater, desert combat boots, solar shades to cool equipment and supplies, the Soldier Integrated Protective Ensemble, Force Provider (a modular, pre-packaged tent city for remote base camp areas), precision airdrop of equipment and supplies, and continuous product improvement for Warfighter recommended, tested, and approved rations.

Natick's focus on the Warfighter elevated the Soldier to be recognized as a major platform and brought about revolutionary transformation resulting in Natick becoming the Lead Technology Integrator for all Soldier equipment. During the 1990's Natick's partnerships with industry, academia, and other governmental agencies flourished. Formal agreements with nearby industry giants and academic powerhouses resulted in enhanced technologies and products arriving to the field more quickly and at less cost. Furthermore, Natick's long-standing relationship with private industry has allowed for quick and easy technology transfer, with efforts not only benefitting the Soldier, but quickly making their way to the American consumer as well.

Natick has faced more complex challenges with the Global War on Terrorism which continue with today's Overseas Contingency Operations. Diligent and innovative support to our troops confronting desert, mountain, jungle and urban terrains logically led to Natick's appointed leadership of the Army's Soldier Systems Integration Domain (SID). The Soldier SID is responsible for leading cross-organizational materiel and non-materiel S&T solutions that enable Soldier and Tactical Small Unit capabilities across all mounted (air, land, sea, and space) and dismounted mission areas, conflict levels, and environments. Natick's Soldier SID



Soldiers installing Modular Ballistic Protective System (MBPS), a lightweight armor system installed directly into existing military shelters where Warfighters work, eat and live



Biomechanical researcher being performed for the warfighter



Air Warrior Microclimate Cooling Garment (MCG)



Laser and Electro-optical Test Facility

Core Technical Competencies

- Joint Service Combat Feeding
- Airdrop/Aerial Delivery
- Clothing and Protective Equipment
- Expeditionary Basing
- Soldier/Tactical Small Unit (TSU) Technology Maturation and Demonstration
- Human Systems Integration Sciences



Natick Soldier Research, Development & Engineering Center (NSRDEC) Natick, MA

leadership, along with participation on the five other multi-organization SIDs and seven Technology Focus Teams (TFTs), have positioned the organization as integral to the synchronization and alignment of command technology solutions, ultimately helping to fulfill higher headquarters' mission to "Empower, Unburden, and Protect the Warfighter". Collaboration with multiple organizations to ensure technology integration across the Soldier's full operational spectrum has demonstrated Natick's trend-setting embrace of enterprise behavior.

Recent/Historical Technical Milestones

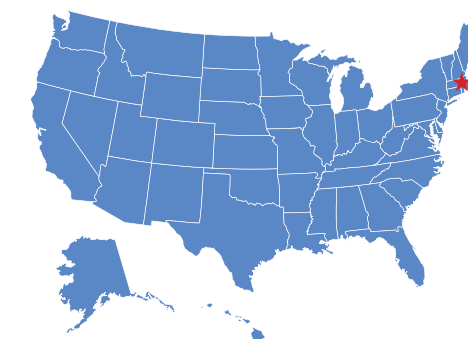
- Landmark FDA Acceptance of Novel Pressure Assisted Thermal Sterilization (PATS) and Microwave Sterilization (MWS) Processes.
- Soldier Camouflage for Operation Enduring Freedom.
- Revolutionary Advances in Optical Switching Technology.
- Precision Airdrop.
- Modular Ballistic Protective System.

Major Locations

NSRDEC Headquarters, Natick, MA

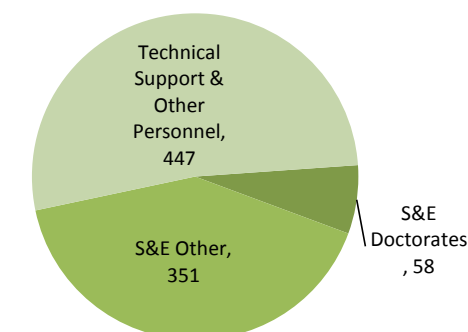
Natick conducts research, development, acquisition and sustainment to maximize combat effectiveness and survivability of freedom's defenders.

NSRDEC Sites

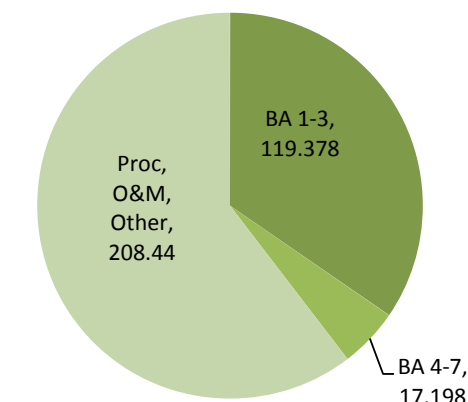


★ Natick, Massachusetts

Human Capital 2010 (total Number)



Budget FY09 (\$ Millions)



Contact Information

For additional information, visit the NSRDEC's website at <http://www.army.mil/info/organization/natick/> or contact Lieutenant Colonel (Retired) David A. Accetta at david.accetta@us.army.mil or by phone 508-233-6938.





Space and Missile Defense Technology Center (SMDTC) Huntsville, AL

Mission

To provide critical technologies that meet today's requirements and address future needs, to develop technologies that enable warfighter effectiveness in the areas of space, high-altitude, directed energy, missile defense and cyberspace, and to actively identify methods to leverage these critical technologies to ultimately support the Army and national security.

Brief History of the Center

U.S. Army Space and Missile Defense Command/Army Strategic Command (USASMDC/ARSTRAT) is built upon a lengthy history of achievement in space and missile defense. Since 1957, when the Army created the first program office for ballistic missile defense, the Command has dedicated itself to missile defense research, development and deployment. In December 1962, the Command made history with the first successful intercept of an Intercontinental Ballistic Missile (ICBM) reentry vehicle with the Nike-Zeus. History was repeated in the 1980s with the development of a new non-nuclear technology. The kinetic energy concept of "hitting a bullet with a bullet" was first proven in June 1984 with the intercept of an ICBM warhead in the Homing Overlay Experiment. In 1987, the Flexible Lightweight Agile Guided Experiment confirmed the concept against shorter-range tactical missiles. Nearly a decade later, the Command demonstrated the missile defense applications of directed energy systems. Then, in February 1996, the Mid Infrared Advanced Chemical Laser destroyed a short-range rocket in flight. Today, the Command continues to make great strides exploring new technologies in the fields of space, high altitude, and cyber.

Space and Missile Defense Technology Center (SMDTC) - In the mid-1990s, the USASMDC underwent a series of reorganizations to better address its dual missions and the Army's priorities. To better align with the organization of the Strategic Defense Initiative Organization (SDIO), new directorates replaced those originally established. The current TC traces its organization to the Missile Defense and Space Technical Center (MDSTC) established at that time. The TC also underscored Huntsville's reputation as a National Center of Excellence for Missile Defense and realized plans to expand Huntsville's role in the Army space mission. In essence, the TC serves as the Command's technology developer, identifying and implementing improvements to current systems and developing new materiel technologies. Recognized for leadership in missile defense technology, Secretary of the Army Togo West in November 1995 designated the U.S. Army Space Strategic Defense Command (USASSDC) a Reinvention Laboratory charged with developing new, innovative and streamlined business practices. Five years later the organization's accomplishments were again recognized when Lieutenant General Ronald Kadish, the Ballistic Missile Defense Organization (BMDO) Director, appointed the USASMDC as the Executive Agent for Ballistic Missile Defense Science and Technology.

Continuing a tradition of over 50 years, the Tech Center's focus on research and development, test and evaluation remains in the areas of radar, optics, interceptors, space technology, directed energy, material and manufacturing technology, lethality, survivability and kill assessment. In recent years, this research has taken new avenues as TC personnel have explored opportunities with high altitude airships, battlefield ordnance awareness, multi-sensor seekers, and operationally responsive space, applying space and missile defense technologies to counter other threat scenarios.



100 KW Solid State Laser



Intense Electromagnetic Pulse (IMP) Weapon

Core Technical Competencies

- High Power Solid State Lasers
- High Power Microwave Devices
- Operationally Relevant Small Satellites and Payloads
- Responsive Low Cost Launch Capability
- Overhead Persistent Infrared
- Space Data Exploitation
- Space Situational Awareness
- Tools and Technologies for Cyberspace Operations
- Cyberspace-Supply Chain Security
- High Altitude-Heavier and Lighter than Air Platforms-High Altitude Vehicles
- High Altitude Payloads
- Advanced Materials for Missile and Missile Defense Applications
- Interceptor Technologies
- Sensors

Space and Missile Defense Technology Center (SMDTC) Huntsville, AL



Recently, the TC directed energy focus has transitioned from chemical lasers to solid state lasers. All in all, the ultimate goal of the TC is to be "more flexible, and [able] to respond more rapidly to new programs and opportunities."

Recent/Historical Technical Milestones

- 100 KW Solid State Laser.
- Space Missile Defense Command - Operational Nanosatellite Effect (SMDC-ONE).
- GATR - first back-pack portable satellite system capable of high-bandwidth satellite communications.
- Intense Electromagnetic Pulse (IMP) Weapon.
- WeaponWatch.

Major Locations

SMDC Headquarters, Huntsville, AL

SMDC conducts space and missile defense operations and provides planning, integration, control and coordination of Army forces and capabilities in support of US Strategic Command missions (strategic deterrence, integrated missile defense, and space operations); serves as the Army force modernization proponent for space, high altitude and global missile defense; serves as the Army operational integrator for global missile defense; and conducts mission-related research and development in support of Army Title 10 responsibilities.

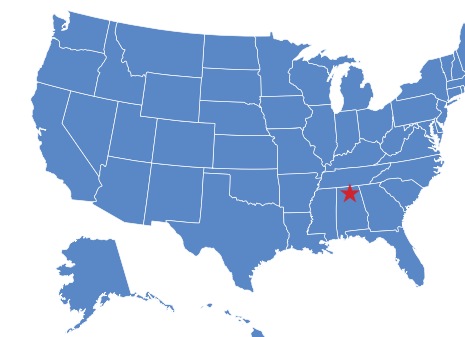


The WeaponWatch Program provides ground forces with actionable information of hostile fire events in real-time to counter attack

Contact Information

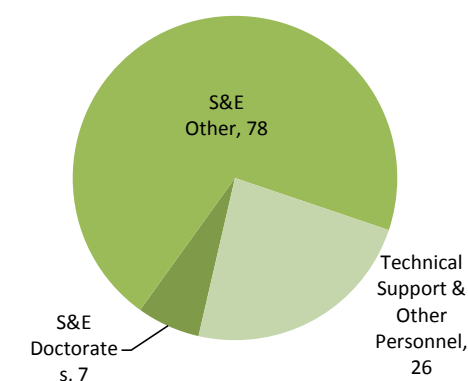
For additional information, visit the SMDC website at <http://www.army.mil/info/organization/unitsandcommands/commandstructure/smdc/> or contact John Cummings, Public Affairs Specialist, at 256-955-1641 or by email, john.cummings@us.army.mil

SMDC Sites

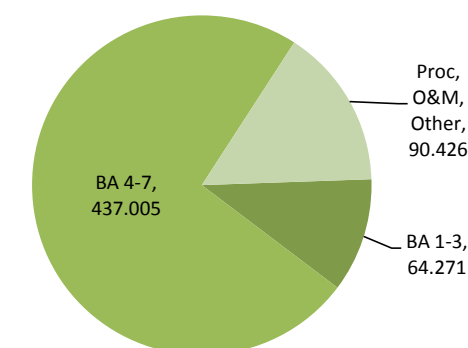


★ Huntsville, Alabama

Human Capital 2010 (total Number)



Budget FY09 (\$ Millions)





Tank Automotive Research, Development and Engineering Center (TARDEC) Warren, MI

Mission

To develop, integrate and sustain the right technology solutions for all manned and unmanned Department of Defense (DoD) ground systems and combat support systems to improve current force effectiveness and provide superior capabilities for the Future Force.

Brief History of the Center

TARDEC is a subordinate organization within the Research Development and Engineering Command (RDECOM). TARDEC is the leader for systems engineering and technology integration for manned and unmanned ground systems, providing research, development and engineering (RDE) support for all DoD ground vehicle systems and equipment.

TARDEC provides systems integration capability to all DoD systems, including support for U.S. Army Training and Doctrine Command (TRADOC) and Program Executive Office (PEO) Integration to perform the concepts, modeling and simulation, and size, weight and power trades for the Ground Combat Vehicle. TARDEC also acts as lead systems integrator for Mine Resistant Ambush Protected Vehicles (MRAP) adding over 20 technologies onto multiple variants of multiple MRAP platform configurations.

TARDEC is based in Warren, Michigan, the heart of the most concentrated source of automotive intellectual capital unmatched anywhere in the country. Roughly 60 percent of American automotive engineers reside and work in Michigan. TARDEC also continues to develop and implement a strategy to initiate and maintain partnerships with universities locally and throughout the country. These institutions are critical to the continual provision of technical expertise at TARDEC.

Recent/Historical Technical Milestones

- Power and Energy (P&E).
- The Joint Center for Ground Vehicles (JCGV).
- Development of Technology Demonstrators.
- Concepts, Analysis, Systems Simulation and Integration (CASSI) Prototyping, Systems Modeling.
- Ground Vehicle Robotics (GVR).



TARDEC's HEAT trains Soldiers how to react in vehicle rollover situations. The HEAT is pictured at bottom right in the inset of this up-armored humvee



APD robotic scout vehicle

Core Technical Competencies

- Ground Vehicle Power and Mobility
- Ground Vehicle Robotics
- Ground Vehicle Survivability; Occupant Centric Protection
- Concepting and Trade Studies (Form, Fit, Function)
- Modeling and Simulation (M&S) and Physical Simulation
- TARDEC Laboratories and Technology Demonstrations
- Life Cycle Management of Ground Systems
- Industrial-Military Liaison for automotive and ground vehicle systems technologies
- System Integration (Center for Ground Vehicle Development and Integration (CGVDI))
- System Engineering (SE)
- Alternative and Operational Energy

Tank Automotive Research, Development and Engineering Center (TARDEC) Warren, MI



Major Locations

TARDEC is headquartered in Warren, Michigan.

Additional divisions are located at Selfridge Air National Guard Base, Michigan (Fresh Water Test Facility, Dynamic Structural Load Simulation Lab, SOCOM Support); New Cumberland, Pennsylvania (TARDEC Petroleum Laboratory Army Petroleum Center); and San Antonio, Texas (TARDEC Fuels and Lubricants Research Facility Southwest Research Institute (SwRI)).

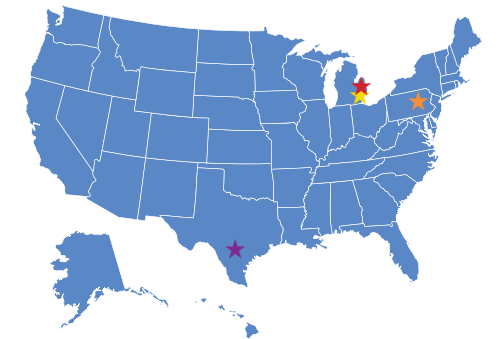


The TALON robot provides Soldiers the ability to identify explosive devices and mines visually and neutralize them from safe stand-off distances



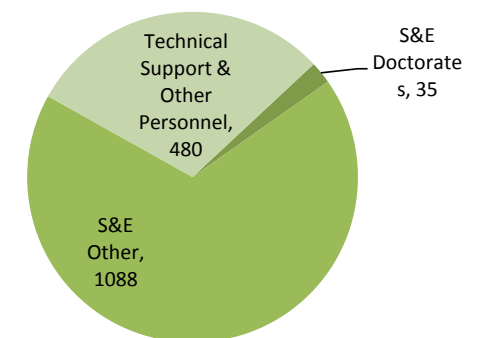
The SPARK mine roller system is meant to detonate improvised explosive devices before they can do serious damage to a vehicle and its occupants

TARDEC Sites

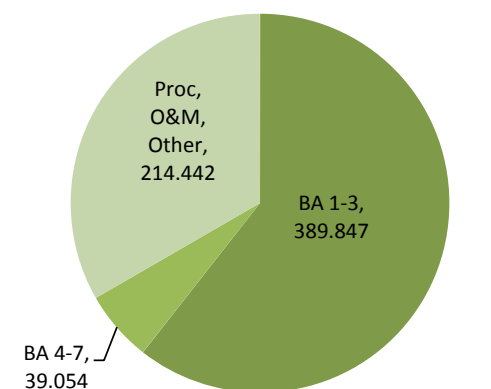


- ★ Warren, Michigan
- ★ Selfridge Air National Guard Base, Michigan
- ★ New Cumberland, Pennsylvania
- ★ San Antonio, Texas

Human Capital 2010 (total Number)



Budget FY09 (\$ Millions)



Contact Information

For additional information, visit the TARDEC's website at <http://tardec.army.mil/default.aspx> or contact Mike Roddin, Public Affairs Representative, at Mike.Roddin@us.army.mil





United States Army Aeromedical Research Laboratory (USAARL) Fort Rucker, AL

Mission

To preserve and enhance the health, safety, combat effectiveness, and survivability of the United States Army warfighter.

Brief History of the Laboratory

The USAARL was originally established as the United States Army Aeromedical Research Unit (USAARU) in October 1962. As envisioned by Major General Spurgeon Neel, United States Army (Retired), the Unit's mission was to both provide direct aviation medical research support to all Army aviation and airborne activities, and to provide a central aeromedical research and reference library. Technical evaluation of aircraft and personnel equipment, aeromedical in-flight observations, and field problem analysis reported by other aviation agencies were part of the Unit's early research program.

In 1969, USAARU was redesignated as a laboratory. Construction began on a new vivarium, and a year later, the Helicopter In-flight Monitoring System (HIMS), an airborne system capable of simultaneously measuring pilot and helicopter performance, was designed, built, and installed aboard the Laboratory's JUH-1J research helicopter. Lighting systems and paint schemes for collision avoidance were also being addressed.

In May 1978, ground was broken for a new laboratory facility, with completion taking place in March 1981. During the 1980s, USAARL scientists and support staff became increasingly involved in field studies throughout the Army in assessing hazards of military systems and operations, and biomedical means of enhancing Soldier selection, performance, and protection.

In 1990, USAARL was honored with the Department of Defense Award for Excellence, and in 1992 USAARL was awarded the Army Superior Unit Award for its support and contributions to Desert Shield/Desert Storm.

In April 2004, USAARL was dedicated in memory of the "Father of Army Aviation Medicine," Major General Neel, for his integral role in the development of the principles of aeromedical evacuation of battlefield casualties.

Today, activities at the USAARL are even more diverse. Laboratory and field studies continue on the ground and in helicopter flight in the research disciplines unique to USAARL: vision and visual enhancement/protection, auditory injury/protection, impact injury/protection, jolt effects, crew stress/workload, and physiological life support. JUH-1V and JUH-60A aircraft and an NUH-60 flight simulator with specialized cockpit environmental controls help researchers with their flight performance investigations. Physicians, engineers, and safety experts work together to understand human injuries and damage to personal protective equipment from a crash. Researchers analyze and correct design and operational deficiencies in flight helmets, crashworthy seating, and restraint systems, while also developing criteria for future Objective Force Warfighter systems.



Flight Surgeon Demonstrates the Use of the Noise Immune Stethoscope



Blunt impacts to FOCUS are measured, and data is used to predict resulting eye and vision injuries

Core Technical Competencies

- Face and Eye Injury Modeling Designed to Develop Ophthalmic Standards for Protective Eyewear
- Generic Neurosensory and Cognitive Effects of Operational Hypoxic Conditions
- Computational Sensory Indices, Combined with Countermeasures for Motion-Sickness and Other Operational Stressors
- Neurosensory Biomarkers for Traumatic Brain Injury (TBI)
- Hearing/ Acoustic Hazards, Protection, and Enhancement
- Return to Duty Research
- Aviation Life Support Equipment
- Human Tolerance to Head-Supported Mass
- Warfighter Face and Eye Injury Protection
- Eye and Vision Hazard Assessment
- Prevention of Head Injury from Blunt Impact and Blast Exposure
- Aviation Life Support Equipment Research and Surveillance
- Operational Survival Analysis
- Airworthiness, Certification, and Evaluation

United States Army Aeromedical Research Laboratory (USAARL) Fort Rucker, AL



Recent/Historical Technical Milestones

- Noise-Immune Stethoscope.
- Head Simulator.
- Stimulants.
- USAARL established two patents and an International Standardization Organization (ISO) standard.
- USAARL published Helmet-Mounted Displays: Sensation, Perception, and Cognition Issues.

Major Locations

USAARL Headquarters, Fort Rucker, AL

USAARL's mission today has expanded to focus on the mounted warrior. It encompasses visual systems research, helicopter crash injury research, helmet impact and retention testing, flight performance research, aeromedical evacuation equipment testing, aircrew hearing protection and communications research, and cognitive modeling and workload assessment. The Laboratory's highly skilled workforce is predominately civilian and consists of rated aviators, physicians, doctoral and masters level researchers, and skilled technicians. USAARL researchers seek to enhance force effectiveness by preventing or minimizing health hazards created by military systems, doctrine and tactics. Specifically, they identify, investigate, and solve medical and health-related problems that deter Soldiers/Aviators from performing their mission or compromise their safety. Collocation with the US Army Aviation Center of Excellence allows the USAARL's unique mix of scientific personnel to successfully conduct critical research for solving operational medicine problems and to provide military developers with information and expertise to enhance the performance and safety of future Army systems.

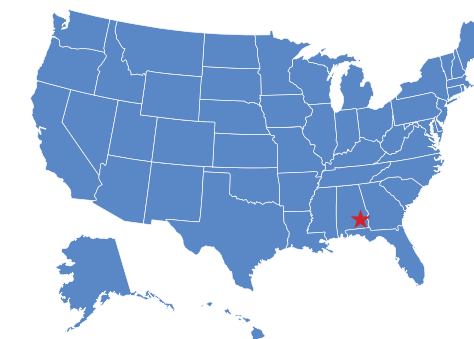


Pilots Flying the NUH-60FS Black Hawk Flight Simulator

Contact Information

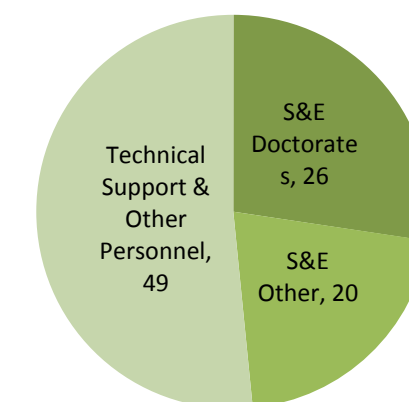
For additional information, visit the USAARL's website at <http://www-rucker.army.mil/tenants/arl.html> or contact Lori Calvillo at 301-619-2736 or by email, Lori.Calvillo@amedd.army.mil

USAARL Sites

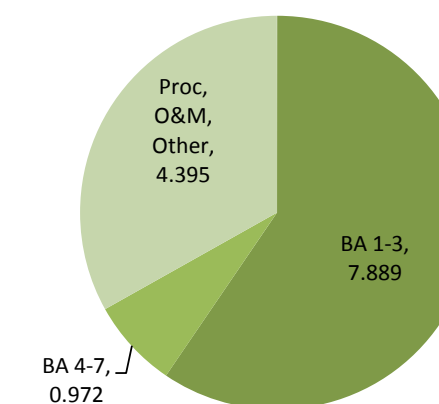


★ Fort Rucker, Alabama

Human Capital 2010 (total Number)



Budget FY09 (\$ Millions)





United States Army Institute of Surgical Research (USAISR) Fort Sam Houston, TX

Mission

To optimize combat casualty care.

Brief History of the Laboratory

The Institute of Surgical Research (USAISR), originally named the Surgical Research Unit, was established in 1943 at Halloran General Hospital, Staten Island, New York. Its mission was to evaluate the role of newly discovered antibiotics in the treatment of war wounds. In 1947, the Institute, with its 12 assigned personnel, moved to Brooke General Hospital, Brooke Army Medical Center, Fort Sam Houston, Texas. At that time, in addition to the study of antibiotics, the Institute was also charged with the study of innovative new surgical techniques and developments. Then in 1949, due to concern regarding the large number of possible casualties generated by nuclear weapons, the Institute's mission was further expanded to include the study of thermal injury. The advent of improved grafting procedures and continued use of antibiotics in new applications grew with this mission.

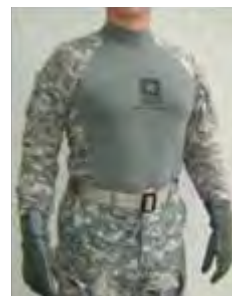
In May 1953, the Institute became a Class II activity of the Surgeon General. It was later assigned to Headquarters, United States Army Medical Research and Development Command in September 1958. During this period the Institute evaluated forward thinking medical research initiatives, including the use of plasma extenders, grafting and preservation of blood vessels, and the use of an "artificial kidney." As the "Army's Burn Unit," this unit served as a prototype and model for civilian burn units all over the world and was a premier dialysis research center serving South Central Texas and neighboring states.

As part of the Army Medical Department reorganization in March 1994, the Institute became a subordinate command of the Medical Research and Materiel Command, itself a major subordinate command of the newly formed Medical Command (MEDCOM). In 1996, the Institute moved to its current location adjacent to the newly constructed Brooke Army Medical Center. At this time, the research focus of the mission changed from thermal injury to the full spectrum of combat casualty care.

The Institute of Surgical Research is a highly decorated and celebrated unit. The Institute has been involved in humanitarian missions to foreign countries such as the Union of Soviet Socialist Republics in 1989, Guam in 1997, and Honduras from 1999 to present.

The Institute has utilized its expertise by caring for burn casualties from every conflict since World War II to Operation Iraqi Freedom and Operation Enduring Freedom, including the 1979 Marine Base fire in Camp Fuji, the 1983 bombing in Beirut, and the 1994 Pope Air Force Base plane crash, as well as dozens of other medical emergencies.

As a result of the 2005 Base Realignment and Closure, in 2010, the combat casualty care research sub-function of Walter Reed Army Institute of Research (from Forest Glen, Maryland) and the Army Medical Research Detachment (from Brooks City-Base, Texas), were co-located and integrated into the USAISR. In addition, the Army Dental and Trauma Research Detachment from Great Lakes, Illinois, became a subordinate unit of the USAISR. With the addition of these units, the Institute has grown from a 12 person staff in 1943 to over 700 military and civilian personnel at present. It continues to serve as the primary Combat Casualty Care research facility for the Army.



Flame-Resistant Army Combat Shirt (FR-ACS)



Combat Gauze; fielded in Iraq/Afghanistan in early 2009



Medical technician at USAISR testing specimens

Core Technical Competencies

- Hemorrhage Countermeasures
- Hypovolemia Countermeasures
- Mechanical Soft Tissue Trauma Countermeasures
- Orthopedic Trauma Countermeasures
- Advanced Diagnostics and Treatment
- Battlefield Anesthesia/Analgesia
- Clinical Trial Management and Execution
- Ocular Trauma Countermeasures
- Blood and Coagulation Research
- Joint Theater Trauma System



United States Army Institute of Surgical Research (USAISR) Fort Sam Houston, TX

Moreover, while continuing its excellence in the field of burn care management, the Institute has expanded and placed equal emphasis in providing medical solutions for the injured soldier on the battlefield.

Also, as a result of the 2005 Base Realignment and Closure, the Battlefield Health and Trauma Research Institute (BHT) was formed. This included the construction of a new building adjacent to Brooke Army Medical Center (BAMC) and connected to the USAISR building, permitting all Department of Defense (DoD) combat casualty care research (minus neuroprotection) to be co-located with the USAISR. This in turn allowed the following Navy and Air Force activities to be added to the BHT:

- The Naval Medical Research Unit, San Antonio (NAMRU-SA), received the combat casualty and research sub-function of the Naval Medical Research Center from Forest Glen, MD, and the Naval Institute for Dental and Biomedical Research from Great Lakes, IL.
- The United States Air Force Dental Evaluation and Consultation Service (DECS) from Great Lakes, IL.

Recent/Historical Technical Milestones

- Combat Gauze – 2008 Army Greatest Invention
- HemCon Chitosan Dressing – 2004 Army Greatest Invention
- Combat Application Tourniquet (CAT) – 2005 Army Greatest Invention
- Damage Control Resuscitation of Severely Injured Soldiers – 2007 Army Greatest Invention
- Flame-Resistant Army Combat Shirt (FR-ACS)

Major Locations

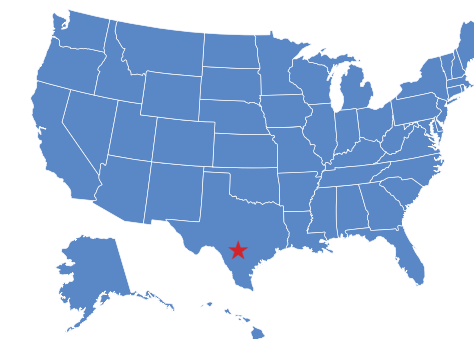
USAISR Headquarters, Fort Sam Houston, TX

The USAISR is dedicated to both laboratory and clinical trauma research. Its mission is to provide requirements-driven combat casualty care medical solutions and products for injured soldiers, from self-aid through definitive care across the full spectrum of military operations; provide state-of-the-art trauma, burn, and critical care to Department of Defense beneficiaries around the world and civilians in our trauma region; and provide Burn Special Medical Augmentation Response Teams.

Contact Information

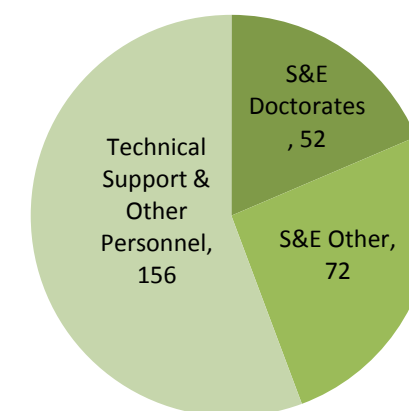
For additional information, visit the USAISR's website at <http://www.usaistr.amedd.army.mil/> or contact Lori Calvillo at 301-619-2736 or by email, Lori.Calvillo@amedd.army.mil

USAISR Sites

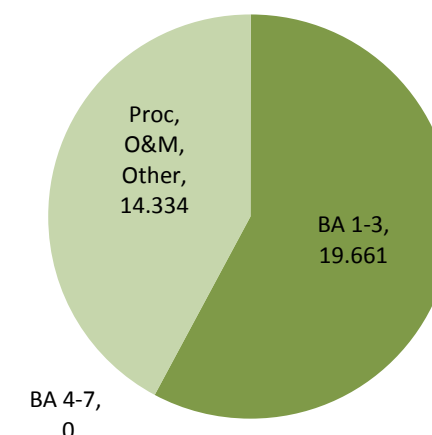


★ Fort Sam Houston, Texas

Human Capital 2010 (total Number)



Budget FY09 (\$ Millions)





United States Army Research Institute of Environmental Medicine (USARIEM) Natick, MA

Mission

To conduct biomedical research to improve and sustain Warfighter health and performance across the full spectrum of operations.

Brief History of the Laboratory

USARIEM is the lead laboratory for military nutrition, occupational medicine, and environmental physiology. Our scientists study the efficacy of strategies to extend performance and avoid or reduce medical problems associated with military operations in all environments. USARIEM has several unique facilities that provide significant capabilities for research that impact the operational performance and health of all service members.

USARIEM conducts biomedical research to improve and sustain Warfighter health and performance under all conditions. The Institute's research yields world-class products, medical information, and military doctrine to project and sustain a healthy force and enable Army transformation. In addition, USARIEM biomedical-research efforts enhance performance and protect military personnel from operational stress and environmental exposures.

Our principal goal is to elucidate complex interactions of environmental stress and the body's physical - and psychological-defense mechanisms and determine techniques, equipment, and procedures that are the most beneficial to ensuring that Warfighters are operationally effective. We develop biomedical techniques to sustain health and to enhance performance through advances in physical fitness and the exploitation of nutritional strategies, pharmacological interventions, ergogenic aids, physiological monitoring technologies, and other novel biotechnological approaches.

The Institute's current research focuses on applied studies such as those in support of the development of limited-weight rations (such as the First Strike Ration); hydration requirements in various extreme conditions; strategies to accelerate altitude acclimatization; strategies to reduce physical-training injuries, including stress fracture and overuse musculoskeletal injuries; and the development of a physiological monitoring system for incorporation into Future Force Systems. New basic and applied research initiatives include animal models of environmental extremes, neuroprotective effects of exercise, nonfreezing-cold injury and biophysical modeling, and neuroepidemiology related to post-deployment and occupational health.

In 2011, USARIEM will commemorate its 50th anniversary. USARIEM was officially activated as an installation of the United States Army Medical Research and Development Command (currently the United States Army Medical Research and Materiel Command) on 1 July 1961 with the mission to conduct basic and applied research to determine how heat, cold, high terrestrial altitude, and work affects the Soldier's life processes, performance, and health. The Institute was created from a composite of elements associated with a number of world-class federal and academic laboratories including the Harvard Fatigue Laboratory in Cambridge, MA; the Armored Medical Research Laboratory at Fort Knox, KY; the Climatic Research Laboratory in Lawrence, MA; and the Quartermaster Research and Development Command in Natick, MA. The Institute was originally a merger of a medical and quartermaster unit. These units and their predecessor laboratories earned a



United States Army Research Institute of Environmental Medicine facility in Natick, Massachusetts



The Nutrient Delivery System is a simple add-on to the Personal Hydration System that enables the user to receive nutrition on-the-move

Soldiers walking into one of the Doriot Climatic Chambers, which are capable of simulating environmental conditions ranging from the arctic to the tropics



Core Technical Competencies

- Thermoregulation in humans
- Human and animal altitude research
- Computer-based testing stations for assessment of cognitive and behavioral Warfighter performance
- Evaluation of the biomechanics of Warfighters
- Environmental and biophysical evaluation chambers
- Bone Health Research Laboratory facility is used for research on adaptations that occur in healthy bone as the result of strenuous physical training



United States Army Research Institute of Environmental Medicine (USARIEM) Natick, MA

worldwide reputation for excellence as a result of their research efforts during and after World War II. From its inception, USARIEM has been a tenant organization on the grounds of Natick Labs (currently Natick Soldier Systems Center) in Natick, MA.

Recent/Historical Technical Milestones

- TBMED 505, Altitude Acclimatization.
- Temperature Feedback System.
- Determined the nutritional value of Military Rations by chemical analysis and supported the development of rations that minimize nutritional deficiencies.
- Determined the effects of deployment to Iraq and Afghanistan on muscle function, body composition, aerobic capacity, and injury potential.
- Developed the Probability of Survival Decision Aid (PSDA).

Major Locations

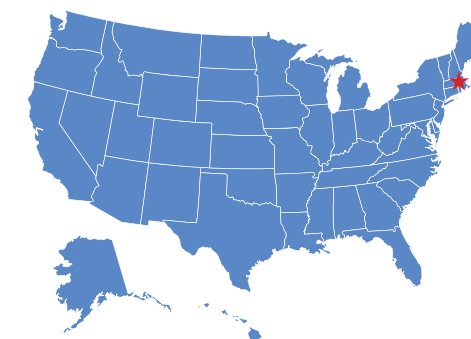
USARIEM Headquarters, Natick, MA

USARIEM is an internationally recognized center of excellence for Warfighter performance science and its useful applications. The institute functions as a world-class laboratory for environmental medicine, physiology, performance and nutrition research. It features integrated cellular, tissue, & human research programs.



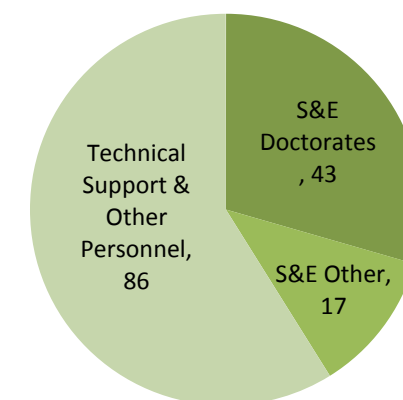
Hypobaric (Altitude) Chamber

USARIEM Sites

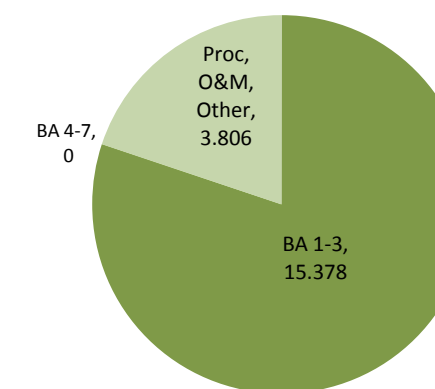


★ Natick, Massachusetts

Human Capital 2010 (total Number)



Budget FY09 (\$ Millions)



Contact Information

For additional information, visit the USARIEM's website at <http://www.usariem.army.mil/> or contact Lori Calvillo at 301-619-2736 or by email Lori.Calvillo@amedd.army.mil





United States Army Medical Research Institute of Chemical Defense (USAMRICD) Aberdeen Proving Ground, MD

Mission

To provide a strong defense against the medical effects of chemical warfare agents and toxins. As the Department of Defense’s lead laboratory for the development of medical countermeasures against chemical threat agents, the U.S. Army Medical Research Institute of Chemical Defense (USAMRICD) is increasingly called upon to provide expert analytical and consultative services related to medical chemical defense research and to the medical management of chemical casualties. The Institute’s growing national and international customer base includes other government agencies, academia, pharmaceutical companies and commercial enterprises.

Brief History of the Laboratory

The United States Army Medical Research Institute of Chemical Defense (USAMRICD) was originally the United States Army Biomedical Laboratory associated with the Chemical Systems Laboratory and United States Army Materiel Development and Readiness Command. It became part of the Office of the Surgeon General (OTSG) and the US Army Medical Research and Development Command (USAMRDC) on July 1, 1979. The Institute was re-designated as the United States Army Medical Research Institute of Chemical Defense on June 30, 1981 while later in November 1994 the USAMRDC was re-designated the United States Army Medical Research and Materiel Command (USAMRMC). The organization of the USAMRICD is of necessity an evolutionary organization that must be responsive to current and anticipated missions, USAMRMC taskings, emerging technologies, new management concepts, changing threats and priorities, variable force structure, budgetary considerations, and the technological capabilities and limitations of the work force. Permanent order 273-023, dated September 30, 2002, attached the United States Army Center for Environmental Health Research (USACEHR) as a subordinate command to USAMRICD. The organization of the USAMRICD consists of:

- a. Command Group: Consists of the Commander, Deputy Commander for Administration, Deputy Commander for Research, Executive Officer, Senior Enlisted Advisor, and administrative support staff.
- b. Special Staff: Consists of the Office of Regulated Studies, Institute Animal Care and Use Committee (IACUC), S1 - Civilian (Human Resources) Military (Adjutant/Detachment Commander), S2 - Safety, Surety, Security, and Intelligence Office, S3 - Program Strategies and Operations Office, S4 - Logistics, S6 - Information Management Office, and S8 - Business Operations Office.
- c. Coordinating Staff: Consists of the following divisions: Research, Analytical Toxicology, Research Support, and Chemical Casualty Care.

The USACEHR is an outgrowth of a robust and comprehensive toxicology program that existed as part of the United States Army Biomedical Research and Development Laboratory (USABRDL) under the United States Army Medical Research and Materiel Command (USAMRMC). Although USABRDL was closed under the 1991 Base Re-alignment and Closure Act, a small contingent remained on-site to support research on the use of sentinel species and bioassays for detecting environmental pollutants. Supported by the United States Army Corps of Engineers as part of installation remediation, this effort established key elements and innovative concepts for medical



Environmental Sentinel Biomonitor (ESB) System Increment 1



Diluter room for toxicity studies with fish and frogs



Artist's rendering of the "New" USAMRICD (under construction)

Core Technical Competencies

USAMRICD

- Neat (undiluted) and dilute agent operations
- Life Sciences expertise
- Analytical chemistry
- Therapeutic efficacy studies using a variety of cell/tissue models
- Molecular and cell biology
- Inhalation exposures
- Diagnostic and prognostic tools for environmental and occupational health surveillance

USACEHR

- Biomarkers and Toxicogenomics
- Environmental Sentinel Biomonitor (ESB) System
- Reproductive Health and Toxicology
- Analytical Chemistry



United States Army Medical Research Institute of Chemical Defense (USAMRICD) Aberdeen Proving Ground, MD

and environmental surveillance. This effort was renamed the United States Army Center for Environmental Health Research (USACEHR) and was organizationally placed under the United States Army Research Institute of Environmental Medicine (USARIEM). Currently, the USACEHR is under the United States Army Medical Research Institute of Chemical Defense (USAMRICD). This organizational relationship is beneficial to both organizations because their missions are closely related. In response to changing requirements and the availability of new biotechnologies, the USACEHR now focuses on two research areas: the Environmental Sentinel Biomonitor System and Biomarker Discovery and Toxicogenomics.

Recent/Historical Technical Milestones

USAMRICD

- Advanced Anticonvulsant System (AAS).
- Bioscavenger (BSCAV).
- Improved Nerve Agent Treatment System (INATS).
- Soman Nerve Agent Pretreatment, Pyridostigmine (SNAPP).
- Multichambered Autoinjector.
- Convulsant Antidote Nerve Agent.

USACEHR

- Environmental Sentinel Biomonitor (ESB) System.
- Coliform Analyzer (CA).
- Intelligent Aquatic Biomonitor System (iABS).
- CeHR Medium.

Major Locations

USAMRICD Headquarters, Aberdeen Proving Grounds, MD

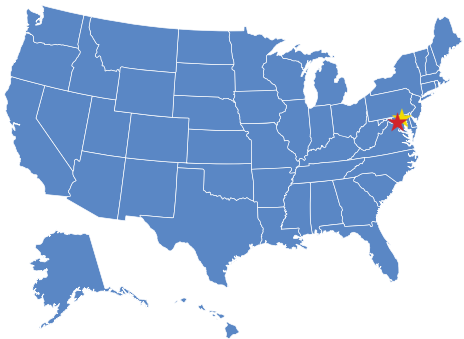
USAMRICD manages a diversified portfolio of medical chemical warfare agent research projects for the Department of Defense and other Federal Agencies. Its continued outstanding performance, support personnel and unique abilities exceed expectations on customer directed research projects.

USACEHR is located at Fort Detrick, MD

Contact Information

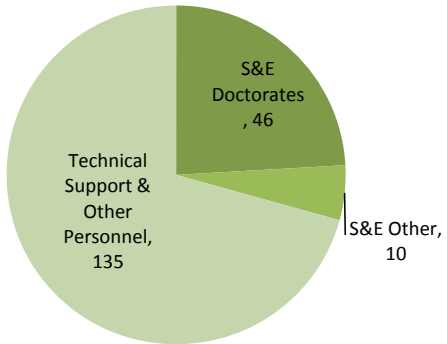
For additional information, visit the USAMRICD’s website at <http://chemdef.apgea.army.mil/> or contact Lori Calvillo at 301-619-2736 or by email Lori.Calvillo@amedd.army.mil

USAMRICD Sites

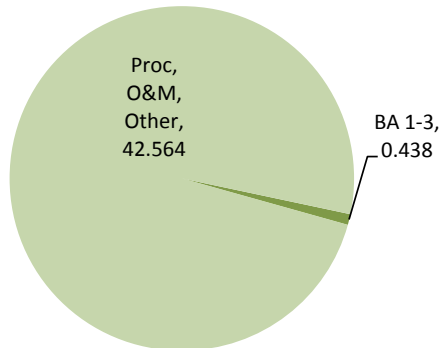


- ★ Aberdeen Proving Ground, Maryland
- ★ Fort Detrick, Maryland

Human Capital 2010 (total Number)



Budget FY09 (\$ Millions)





United States Army Medical Research Institute of Infectious Diseases (USAMRIID) Fort Detrick, MD

Mission

To conduct basic and applied research on biological threats resulting in medical solutions to protect the warfighter.

Brief History of the Laboratory

USAMRIID was established by General Order No. 6, dated January 27, 1969, Office of the Surgeon General of the Army. Its mission is to develop medical defenses against biological warfare threats.

Since its inception, USAMRIID has played a key role as the lead laboratory for medical aspects of biological defense for the Department of Defense (DoD). The Institute develops vaccines, drugs, diagnostics, and information to protect United States military service members from biological warfare threats and endemic diseases. It is the only laboratory within DoD with the capability to study highly hazardous viruses requiring maximum containment at Biosafety Level 4 (BSL-4).

While the USAMRIID primary mission is to protect the Warfighter, its research has applications that benefit society as a whole. USAMRIID-developed vaccine candidates for anthrax are currently in clinical testing. Other vaccine candidates for plague, botulinum neurotoxins A and B, and Venezuelan equine encephalitis are in advanced development, as is the Joint Biological Agent Identification System (JBAIDS), an integrated diagnostics platform for biological-threat agents. Vaccines for staphylococcal enterotoxins A and B, hantaviruses, and five additional serotypes of botulinum neurotoxins (designated C-G) are soon to be transitioned.

About a dozen other vaccines developed at USAMRIID are maintained in Investigational New Drug status and are used to immunize at-risk personnel in the lab and in the field when necessary. The Institute is also working to develop therapeutics for a number of agents, such as Ebola virus, plague, several toxins, and orthopoxviruses (including smallpox, which is studied by USAMRIID investigators at the CDC—the only official repository of the smallpox virus in the United States).

USAMRIID's science and technology base serves to address current threats to United States military personnel and is an essential element in the medical response to any future biological threats that may confront our nation.

Recent/Historical Technical Milestones

- Ebola VLP Vaccine.
- Filovirus assays for the DoD Joint Biological Agent Identification System (JBAIDS).
- Ebola Therapeutic.



Laboratory technician prepares tissue samples for microscopic evaluation



A blue BioSafety Level 4 suit rests on a bed

Core Technical Competencies

- Biocontainment Laboratories
- Subject matter experts on specific pathogens and the processes by which it causes disease
- Animal Models
- Aerobiology
- Veterinary pathology
- Vaccines and the ability to identify and evaluate vaccine candidates
- Therapeutics
- Diagnostics



United States Army Medical Research Institute of Infectious Diseases (USAMRIID) Fort Detrick, MD

Major Locations

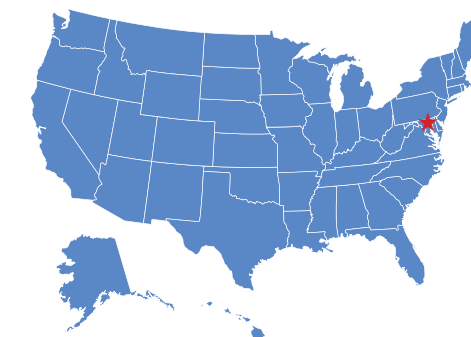
USAMRIID Headquarters, Fort Detrick, MD

USAMRIID conducts basic and applied research on biological threats resulting in medical solutions to protect military service members. It is the lead medical research laboratory for the US Biological Defense Research Program. The Institute plays a key role as the only laboratory in the Department of Defense (DoD) equipped to safely study highly hazardous infectious agents requiring maximum containment at biosafety level (BSL)-4.



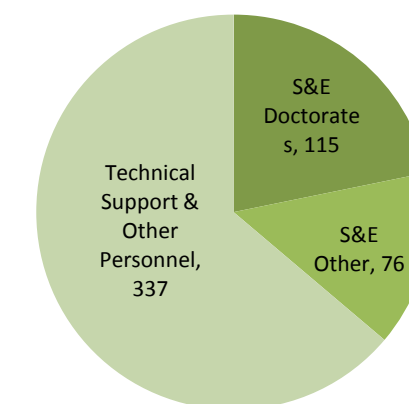
Researcher wearing a BioSafety level 4 suit

USAMRIID Sites

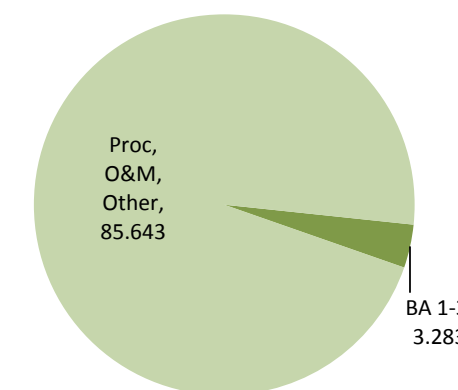


★ Fort Detrick, Maryland

Human Capital 2010 (total Number)



Budget FY09 (\$ Millions)



Contact Information

For additional information, visit the USARIEM's website at <http://www.usamriid.army.mil/index.htm> or contact Lori Calvillo at 301-619-2736 or by email Lori.Calvillo@amedd.army.mil





Walter Reed Army Institute of Research (WRAIR)

Silver Spring, MD

Mission

To conduct global medical research to meet Department of Defense (DoD) requirements and deliver life-saving products to ensure combat effectiveness of the warfighter.

Brief History of the Laboratory

The Walter Reed Army Institute of Research (WRAIR; pronounced “rare”) is currently transforming itself into two Centers of Excellence (CoE) for Infectious Disease Research and Military Psychiatry and Neuroscience in its world-wide operation. The Institute’s history, however, dates back to the 1893 development of the Army Medical School, where physicians first learned of military infectious disease threats, the real determinants of the outcome of war. In the early 1950s, the research unit focusing on these threats was officially named the Walter Reed Army Institute of Research.

For the modern WRAIR, the CoE for Military Psychiatry and Neuroscience is already intact (as of March 2010) and actively researches traumatic brain injury, whether blast-induced or penetrating, the management of sleep and wakefulness, and the behavioral health and readiness of forward-deployed Soldiers. The developing CoE for Infectious Diseases Research will be shaped from the existing research divisions with emphases on malaria drugs for prophylaxis and treatment, the prevention and characterization of viral and retroviral diseases such as dengue, influenza and HIV/AIDS, as well as from malaria vaccine development, disease vectors/entomology, disease pathology, and preventive medicine.

WRAIR maintains three overseas laboratories: the United States Army Medical Research Unit - Europe (USAMRU-E; Heidelberg, Germany), the Armed Forces Research Institute of the Medical Sciences (AFRIMS; Bangkok, Thailand), and the United States Army Medical Research Unit - Kenya (USAMRU-K; Nairobi, Kenya). The research emphasis for USAMRU-E is that of military operational medicine with a special concentration on psychological resilience and comprehensive Soldier fitness. For 50 years, AFRIMS, a joint command of the Royal Thai Army and the WRAIR, has led significant advances in the prevention and treatment of tropical infectious diseases including dengue, malaria, infectious diarrhea, hepatitis, and others. The Retrovirology Department continues to be instrumental in executing vaccine trials in the study of HIV/AIDS. A recently initiated program to monitor new, emerging disease threats as a part of a Global Emerging Diseases Surveillance system is now underway at AFRIMS. To carry out this unique research endeavor, as many as 16 field sites have been active throughout Southeast Asia. For over 40 years, USAMRU-K has been similarly diverse in its study of tropical diseases including malaria, disease insect vectors, and, through collaboration with the H.M. Jackson Foundation, in the prevention, care, and treatment of HIV/AIDS in Kenya, Tanzania, Nigeria, and Uganda at numerous sites.



Walter Reed Headquarters in Silver Spring, MD



Pre and Post Deployment Screening

Core Technical Competencies

- Biomedical research and development
- OCONUS Research Platforms
- Six CONUS and OCONUS College of American Pathologists (CAP)
- Antigen discovery and vaccine development
- Drug discovery
- Clinical trials centers on three continents
- Pilot production of quality biologicals
- Prominent military behavioral health and neurosciences research groups
- AAALAC- accredited animal facilities



Walter Reed Army Institute of Research (WRAIR)

Silver Spring, MD

Recent/Historical Technical Milestones

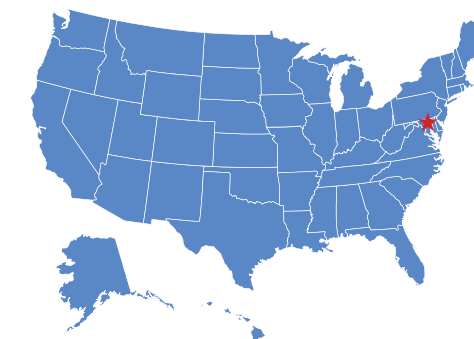
- First efficacious malaria vaccine.
- Stay Alert gum approved for First Strike Ration (caffeine-supplement gum).
- Battlemind training developed and efficacy shown (post-traumatic stress/returning Soldiers to civilian life).
- Japanese encephalitis vaccine.
- First ever modest efficacy of an HIV vaccine.

Major Locations

WRAIR is headquartered in Silver Spring, Maryland.

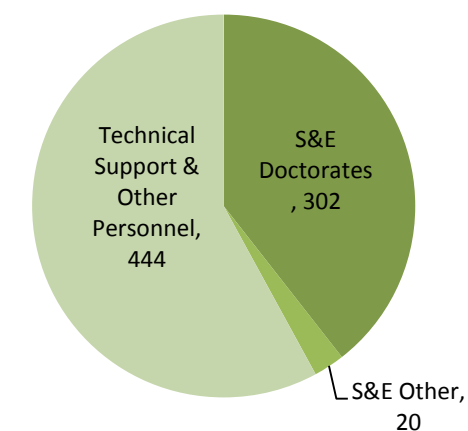
Additionally, WRAIR has three locations overseas; Heidelberg, Germany; Nairobi, Kenya; and Bangkok, Thailand.

WRAIR Sites

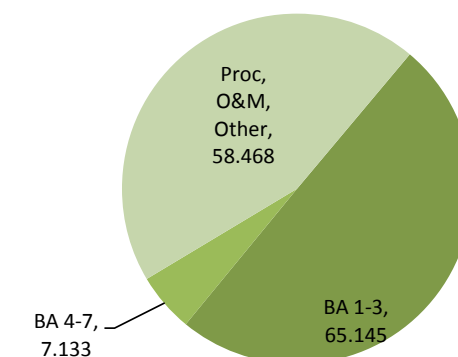


★ Silver Spring, Maryland

Human Capital 2010 (total Number)



Budget FY09 (\$ Millions)



Contact Information

For additional information, visit the Walter Reed’s website at <http://www.wramc.amedd.army.mil/Pages/default.aspx> or contact Lori Calvillo at 301-619-2736 or by email Lori.Calvillo@amedd.army.mil





NAVY LABORATORIES





Naval Air Warfare Center Weapons Division (NAWCWD) - China Lake and Point Mugu, CA

Mission

To execute full-spectrum weapons and warfare systems RDT&E. Vision. To be the leader providing innovative, integrated, and dominant war-fighting effects for our Naval, joint and coalition forces. Providing our war-fighters the decisive advantage.

Research, Development, Acquisition, Test and Evaluation (RDAT&E)

- World leader in RDAT&E of guided missiles, advanced weapons and systems, complex software integration on tactical aircraft, energetic materials
- Aircraft / Weapons Systems Integration: AV-8B, EA-6B, EA-18G, F/A-18G, EP-3E, H-1, JSF, UAS, F-22
- Full-spectrum RDAT&E for free-fall weapons, targets, support equipment, crew systems, and electronic warfare
- Operate the Land and Sea Ranges using state-of-the-art network-centric warfare, modeling and simulation, and full-scale surface and sub-scale aerial targets
- Joint live-fire survivability testing
- Energetics formulation and production
- Develop counter Improvised Explosive Devices (IED)
- Weaponize unmanned systems

Direct Conflict Involvement

NAWCWD played a significant role in every U.S. military crisis beginning with WWII. During Operation Iraqi Freedom a few quick-response topics include: CH-53E, Cobra Dos, Low Collateral Damage Bomb, Electronic Warfare Database Support, GBU-24E/B Laser-Guided Bomb, Improvised Explosive Devices, Countermeasures, Intrepid Tiger Pod, Jammer Technique Optimization, Joint Direct Attack Munition, Man Portable Air Defense Systems, MH-60R, Precision Strike Suite for Special Operations Forces, P-3C search capability, Rapid Attack Information Dissemination and Execution Relay, Shared Reconnaissance Pod. New technologies are now being developed for the ongoing war on terror, and will be reported when not detrimental to successful operations in theater.



Latest Technologies

Unmanned Systems. Developing micro munitions for weaponization, and conducting RDT&E on more than 25+ systems including Reaper, Global Hawk, Raven, Predator, Scan Eagle, iRobot, and Fire Scout.

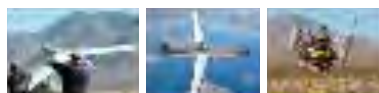


• Scan Eagle Guided

Munition. 3-1/2 pound laser guided bomb designed for operation from small UAVs. Advancing toward inert flight demonstration.

• GPS Guided Munition.

One pound precision miniature munition for use from handheld 40mm grenade launchers and UAVs. Completed guided air gun launches. Potential growth options include IR or EO seeker and extended range.



Improvised Explosive Device (IED) Countermeasures.

Built unique training facilities replicating Iraq and Afghanistan environments. Developing new weapons, tools, and tactics to counter the serious IED warfighter threat.

Thermobaric Metal Augmented Charge (MAC) Warhead.

NAWCWD developed and fielded the Hellfire AGM-114N missile. MAC has proven a huge warfighters success with 400 warheads produced locally and 11,000 now produced by ATK!

Spike. 5 lb, \$5K, tiny, accurate, shoulder-launched guided missile the size of a loaf of French bread. Man-portable, UAV capable, and perfect for future robotic weapon systems.

LOGIR. A low cost, precision guidance kit for rockets, able to kill large numbers of small moving targets in a single sortie quickly and surgically, with reduced pilot exposure. LOGIR does for rockets what JDAM does for iron bombs!

BioFuel. Researchers are developing new methods to produce diesel and full-performance jet fuels from renewable sources such as waste cellulose.

DTRA Chemical / Biological Agent Defeat Program. Projects to investigate explosive fills that upon detonation, generate species that can kill biological weapons or cause breakdown of chemical weapons.

E/A-18G. Integration team completed IOT&E and recommended the Growler for fleet deployment.

Electronic Warfare. Released F/A-18 and AV-8B EW Suite CY2008, the latest intelligence threat update critical to TACAIR aircraft survivability.

Other Technologies. Directed energy, and high-speed weapons, network centric warfare, Homeland Defense, time critical long range strike. Major thrust in alternative and reusable energy.

NAWCWD

China Lake and Point Mugu, CA

Annual Test Events: 1,526

Training Sorties (annually): 39,000+

Land: 1.1 million acres
(larger than Rhode Island)

- Navy's largest single landholding
- 85% of Navy RDT&E lands
- 52% of Navy lands worldwide

Sea: 36,000 square miles, expandable to 196,000

Air: R-2508 is 12% of California's total air space

Annual Visitors: 42,710

Foreign Visitors: 1,745



Facilities and Ranges

The Navy Region Southwest proudly hosts NAWCWD on its facilities at China Lake and Point Mugu, California.

- Plant replacement value: \$2 billion+
- Buildings and facilities: 1,800+
- New construction: 400,000 sq ft, 4 new labs, 5 new facilities
- Three airfields
- Warfighter Response Center provides subject matter experts internationally
- Unique world class facilities and test ranges
- Optimal test environment - 350+ clear days per year
- Geographic Diversity - Vast ocean, deep water ports, islands, mountains, deserts, canyons, and forests - in close proximity within restricted air and land space.

Technology Transfer (Examples)

- CL-20 (most significant energetic material in 50 yrs.)
- Auto air-bag sensors
- Ultrasonic scanning
- Stop-action video
- Geothermal energy

Developmental Testing. Naval Test Wing Pacific

VX-31 (China Lake). VX-30 (Point Mugu)

- Operational Testing. VX-9 (COMOPTEVFOR)
- Marine Aviation Detachment (MAD)

Weapons. Airborne Laser Test bed, AEGIS, AMRAAM, AARGM, ESSM, Bombs, HARM, Harpoon, Hellfire, JDAM, JSOW, Laser Guided Bombs, LCDB, LOGIR, RAM, SLAM, SLAM-ER, Sidewinder, Sparrow, Standard Missile, Tomahawk, Trident.

Programs/Projects/Systems (Examples)

AESA, ASG, CIED, DPSS, DGTDS, Embarkable Link-16, EW Systems, JHMCS, High Speed Weapons, Infrared and Electronic Countermeasures, Intrepid Tiger Pod, Link-16, MIDS, SHARP, Tactical Aircraft Electronic Warfare, TOPSCENE, WSSA.

Mars Lander 2004. Designed, built, and installed the zylon bridle system onto each spacecraft; jointly developed, with NASA's Jet Propulsion Laboratory (JPL), the descent rate limiter, and radar system; tested the retro-rockets, and multi-body tests.

History

China Lake. Established during WWII to test rockets developed by the California Institute of Technology.

Point Mugu. Established in 1946 as the Navy's first instrumented missile test sea range.

Location

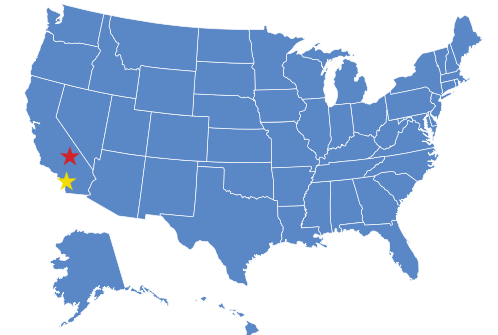
China Lake. 150 miles NE of Los Angeles (desert)

Point Mugu. 50 miles N of Los Angeles (coast)

Contact Information

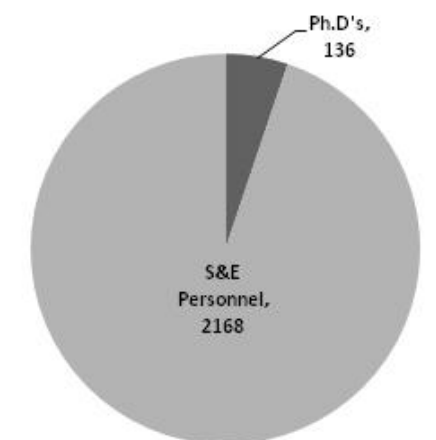
COMMANDER CODE 750000D
NAVAIRWARCENWPNDIV
1 ADMINISTRATION CIRCLE STOP 1013
CHINA LAKE CA 93555-6100
Public Affairs Office: 760-939-3511
Email: NAWCWD-PAO@navy.mil
Web: <http://www.navair.navy.mil/nawcwd/>

NAWC Sites

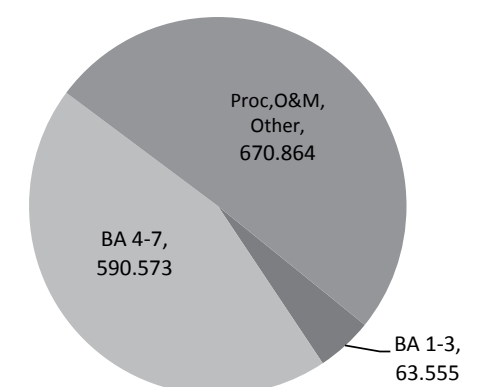


- ★ China Lake - 150 miles NE of Los Angeles (desert)
- ★ Point Mugu - 50 miles N of Los Angeles (coast)

Human Capital 2010 (total Number)



Budget FY09 (\$ Millions)





Naval Air Warfare Center Aircraft Division (NAWCAD) - Patuxent River, MD

Mission

To support the Navy by providing the warfighter with technologies that deliver dominant combat effects and matchless capabilities.

Brief History of the Directorate

The Patuxent River (known as “Pax River”) Naval Air Station Complex stretches across 25 miles of shoreline at the mouth of the Patuxent River, overlooking the picturesque Chesapeake Bay, 65 miles southeast of Washington DC and 90 miles south of Baltimore. The Complex supports naval aviation operations by researching, developing, testing and evaluating aircraft, aircraft components and related products. The facilities are also used by foreign governments, academic institutions and private industry for similar projects.

The station was formally commissioned “U.S. Naval Air Station, Patuxent River, Maryland” on April 1, 1943. The unofficial name had been Cedar Point or the Naval Air Station at Cedar Point, but officials were concerned about possible confusion with the Marine Corps Air Station Cherry Point, North Carolina, so the new facility was named for the adjacent river.

NAWC Patuxent River continues to serve as the Navy’s principal research, development, test, evaluation, engineering and fleet support activity for naval aircraft, engines, avionics, aircraft support systems and ship/shore/air operations. This is also the testing facility for the new V-22 Osprey. In addition, the installation hosts the Navy Test Pilot School, and both NAS Patuxent River and the nearby OLF Webster host Unmanned Aerial Vehicle operations, all of which regularly use the installation’s airspace complex. Additional Commands located at Patuxent River are:



F-35C prepares to take off

- U.S. Naval Test Pilot School
- Scientific Development Squadron 1
- Air Test and Evaluation Squadron 20
- Rotary Wing Test Squadron 21
- Air Test and Evaluation Squadron 23



V-22 Osprey in-flight

Core Technical Competencies

- Air Vehicles
- Propulsion and Power
- Avionics and Sensors
- Crew Systems

Major Locations

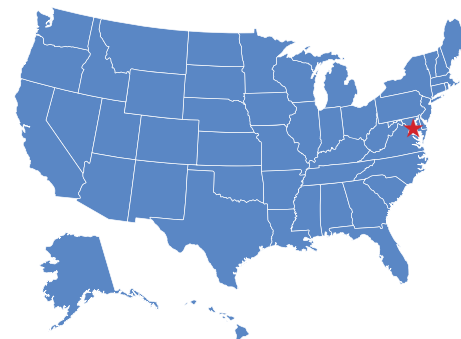
NAWCAD Patuxent River is located in Patuxent River, Maryland.

Contact Information

Naval Air Station Patuxent River
22268 Cedar Point Road
Bldg. 409 Suite 204
Patuxent River, MD 20670
Public Affairs Office: 301-757-6748

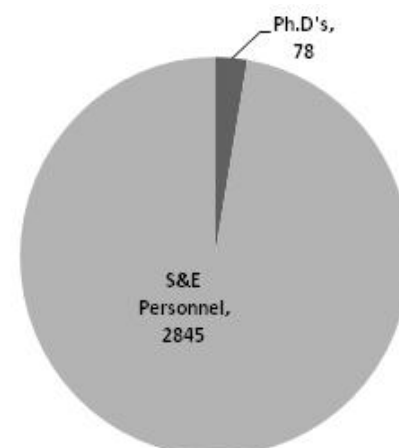


NAWCAD Sites

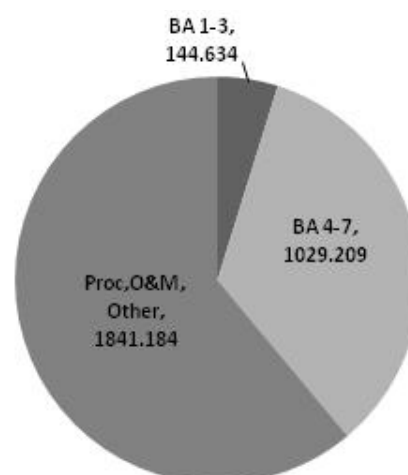


★ Patuxent River, Maryland

Human Capital 2010 (total Number)



Budget FY09 (\$ Millions)



NAWCAD - Training Systems Division Orlando, FL



Mission

To be the principal Navy center for research, development, test and evaluation, acquisition and product support of training systems, to provide Interservice coordination and training systems support for the Army and Air Force, and to perform such other functions and tasks as directed by higher authority.

Brief History of the Directorate

The roots of The Naval Air Warfare Center Training Systems Division (NAWCTSD) reach back to April 1941 when then-Commander Luis de Florez became head of the new Special Devices Desk in the Engineering Division of the Navy’s Bureau of Aeronautics. De Florez championed the use of “synthetic training devices” and urged the Navy to undertake development of such devices to increase readiness. In June, the desk became the Special Devices Section.

As The Naval Air Warfare Center Training Systems Division evolved and grew, it was aligned at various times under several different parent organizations within the Navy. In 1956, it became the Naval Training Device Center. Over a three-year period in the mid-1960s, the Center moved from its Long Island location to Orlando, Florida. In 1985 the then-Naval Training Equipment Center became the Naval Training Systems Center. The Center moved to its present headquarters building near Orlando, named for its founding father de Florez, in 1988. On October 1, 1993, the Naval Training Systems Center became today’s The Naval Air Warfare Center Training Systems Division. The Naval Air Warfare Center Training Systems Division is a significant component of the Naval Air Systems Command.

The roles of the Department of Defense, the Navy, and the Naval Air Systems Command are changing. Simulation and training will be critical to ensuring military preparedness and to adapting to new and changing roles and missions as force levels decline. These changes, coupled with diverse threat potentials in the post-Cold War world, will require innovative approaches to how our military trains.

The NAWCTSD will play a vital role in maintaining the defense posture of this nation and our allies around the world in the future. Training systems and plans must be developed simultaneously with emerging weapon systems if we are to be prepared for a military emergency. The training systems must also be effective and cost efficient.

Core Technical Competencies

- Development and full life cycle support of training systems
- Front-End analysis (Instructional Systems Design)
- Research in technologies and improved methods for simulation and training
- Standards development for training systems

Major Locations

NAWCAD Training Systems Division is located in Orlando, Florida.

Contact Information

NAWCTSD
12350 Research Parkway
Orlando, FL 32826
Public Affairs Office: (407)-380-8372

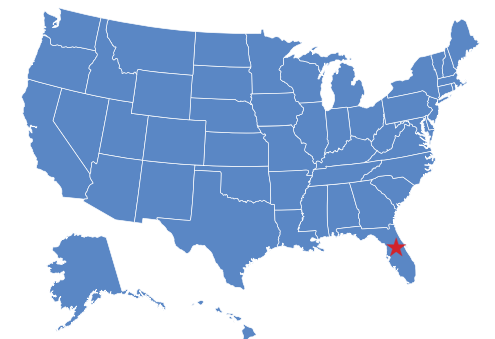


F/A-18 Hornet cockpit simulator



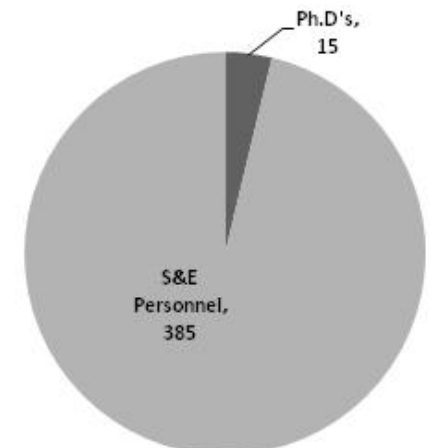
Marines wait their turn for the “dunker,” which is used to train them how to escape from a submerged aircraft or helicopter

NAWCAD Sites

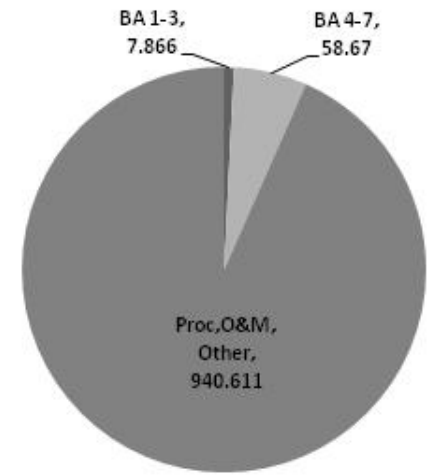


★ Orlando, Florida

Human Capital 2010 (total Number)



Budget FY09 (\$ Millions)





NAWCAD - Lakehurst

Lakehurst, NJ

Mission

To provide unsurpassed products and services to the Naval Aviation Enterprise. NAVAIR Lakehurst's Aircraft Platform Interface provides the critical facilities and services necessary to permit fixed and rotary wing aircraft to operate safely and effectively from ships at sea and from austere U.S. Marine Corps expeditionary airfields worldwide. Lakehurst is the only activity in the world responsible for this unique and vital aspect of Naval Aviation.

Brief History of the Directorate

NAVAIR Lakehurst is the Navy's only complete catapult and arresting gear prototyping and testing facility. Located on Joint Base McGuire-Dix-Lakehurst (JB MDL) in Central New Jersey, NAVAIR Lakehurst is the critical link between Naval Aviation and the Navy Aircraft Carrier (CV) Battle Groups worldwide. Lakehurst is the Navy's lead engineering support activity for Aircraft Launch and Recovery Equipment (ALRE) and Naval Aviation Support Equipment (SE), and is responsible for maintaining fleet support and infusing modern technology across the entire spectrum of equipment needed to launch, land and maintain aircraft from ships at sea and austere USMC sites.

The unique facilities in the test complex include: a 12,000-foot dedicated RDT&E



F/A-18E Super Hornet prepares to takeoff using EMALS

Core Technical Competencies

- Launch and Recovery
- Aviation Information Systems
- Visual Landing Systems
- Flight Deck and Weapon Handling
- Propulsion Support
- Avionic Support
- Aircraft/Weapons/Ship Compatibility



runway (with 2 fleet representative aircraft carrier steam catapults, the CVN-78 Class new generation electromagnetic catapult and 2 fleet representative arresting gears mid-span), a full scale fleet representative Jet Blast Deflector site and three active mile-long jet car test tracks used to propel dead loads up to 100,000 lbs into arresting gear under test including the new generation Advance Arresting Gear (AAG).

JB-MDL, the nation's only tri-service joint base, spans more than 20 miles east to west equaling 42,000-contiguous acres. 58,000 acres of protected land surrounds the installation and it is bordered by two of the largest NJ counties, Ocean and Burlington, and includes 10 townships or boroughs. The base is strategically located between NY City and Washington DC with the capability to respond to any emergency that may arise. Active-duty, reserve and guard service members from the U.S. Air Force, U.S. Army, U.S. Navy, U.S. Marine Corps and U.S. Coast Guard ensure total force integration by training, supporting and sustaining installation and global contingency operations. JB-MDL is uniquely capable and positioned to project and support air, land and sea power in support of our nation's defense. The future military is being designed and tested at New Jersey's Joint Base Today.

Recent/Historical Technical Milestones

- Electromagnetic Aircraft Launch System (EMALS)
- Advanced Arresting Gear (AAG)
- Aviation Data Management Control System (ADMACS Blk 2)
- electronic Consolidated Automated Support System (eCASS)

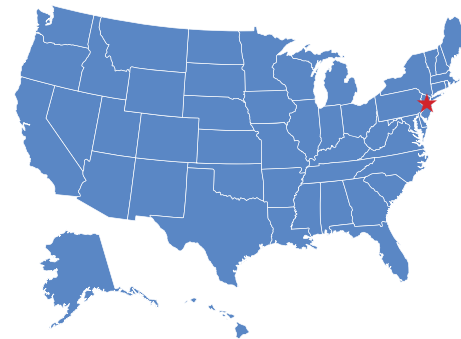
Major Locations

NAWCAD Lakehurst is located in Lakehurst, New Jersey.

Contact Information

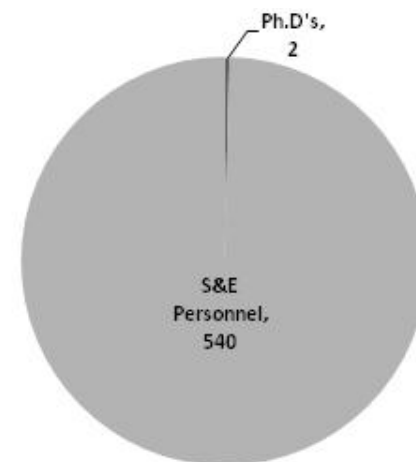
Naval Air Warfare Center Aircraft Division – Lakehurst
Highway 547, Lakehurst, NJ 08733
Public Affairs Office: 732-323-2811

NAWCAD Sites

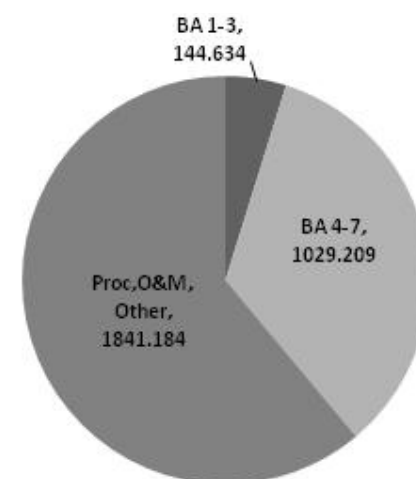


★ Lakehurst, New Jersey

Human Capital 2010 (total Number)



Budget FY09 (\$ Millions)



Total budget for NAWC Lakehurst and NAWC Pax River combined

NRL - Naval Research Laboratory

Washington, D.C.



Mission

NRL is the Navy's full-spectrum corporate laboratory, conducting a broadly based multidisciplinary program of scientific research and advanced technological development directed toward maritime applications of new and improved materials, techniques, equipment, systems and ocean, atmospheric, and space sciences and related technologies. NRL is a subordinate command under the Chief of Naval Research (CNR) in the office of the Secretary of the Navy.

Brief History of the Directorate

NRL was established in response to a suggestion made by Thomas Edison. In May 1915, the New York Times printed a letter from Edison in which the world-renowned inventor recommended: "The Government should maintain a great research laboratory ... In this could be developed ... all the techniques of military and naval progression without any vast expense." Secretary of the Navy Josephus Daniels seized this opportunity to enlist Edison's assistance as head of a new body of civilian experts - the Naval Consulting Board - to advise the Navy on science and technology. One of the Board's projects was creation of the first modern research facility in the Navy. Established by an act of Congress, NRL opened on July 2, 1923.

The Laboratory's two original divisions, Radio and Sound, pioneered in the fields of high-frequency radio and underwater sound propagation. They produced communications equipment, sonar sets, and perhaps most significant of all, the first practical U.S. radar. NRL's seminal work in the field of radio propagation also laid the foundation for modern HF wave-propagation theory. This led to the Navy's acceptance of HF radio frequencies, which had a profound effect upon naval communications for the next 50 years, and led to the Laboratory's development of over-the-horizon radar.

NRL pioneered naval space research from atmospheric probes with captured V-2 rockets. It directed the Vanguard project – America's first satellite program, and invented the world's first intelligence satellite (GRAB-I), launching it only 52 days after an American U-2 reconnaissance aircraft was lost over Soviet territory. It also formulated the original concepts and developed the satellite prototypes for the Global Positioning System, which earned NRL the Collier Trophy "for the most significant development for safe and efficient navigation and surveillance of air and spacecraft since the introduction of radio navigation 50 years ago."



50-foot Radio Telescope - Unofficial symbol of the laboratory

Core Technical Competencies

- Sensors, Electronics, and Electronic Warfare
- Materials / Processes
- Battlespace Environments
- Undersea Warfare
- Information Systems Technology
- Space Science and Platforms
- Nanoscience





NRL - Naval Research Laboratory

Washington, D.C.

Deep-sea search technologies were developed by NRL and used by expeditions that found the Navy's lost submarines, USS Thresher and USS Scorpion, and located and recovered a lost H-bomb off Spain's coast. NRL developed Aqueous Film-Forming Foam in the aftermath of destructive fires aboard the USS Forrestal and USS Enterprise. This firefighting agent was subsequently adopted for use by U.S. aircraft carriers, all branches of the U.S. armed forces, NATO members, and fire departments worldwide. In 1985, NRL's Dr. Jerome Karle received the Nobel Prize for chemistry. And today, NRL is focusing on new Navy strategic interests in the 21st century, a period marked by global terrorism, shifting power balances, and irregular and asymmetric warfare.

At its most fundamental, the idea behind NRL's creation was to help build American sea power and protect national security through technological innovation. Over the more than eight decades since its creation, the Navy's corporate laboratory has fulfilled Edison's vision with a record of technical excellence that has made a profound impact on the security of the U.S. In 2005, the Navy League's New York Council recognized NRL with the Roosevelt Gold Medal for Science. The League noted, "NRL has helped make the U.S. Fleet the most formidable naval fighting force in the world" and called it "the Government's premier defense research laboratory."

Recent/Historical Accomplishments

- The ALE-50 electronic warfare decoy protects combat aircraft so well that it earned the nickname "Little Buddy" from our pilots during the Kosovo air campaign.
- Dragon Eye™ is an expendable, hand-launched, 5.5-pound surveillance plane carried by U.S. Marines in a backpack. A model is on exhibit at the National Air and Space Museum.
- Specific Emitter Identification technology identifies any radar by its unique characteristics with such accuracy as to "fingerprint" it. The National Security Agency selected it as the national standard.
- CT-Analyst provided crisis assessment for the Washington D.C. area in the event of an airborne contaminant release during the 2009 Presidential Inauguration. It was also deployed during Operation Iraqi Freedom.

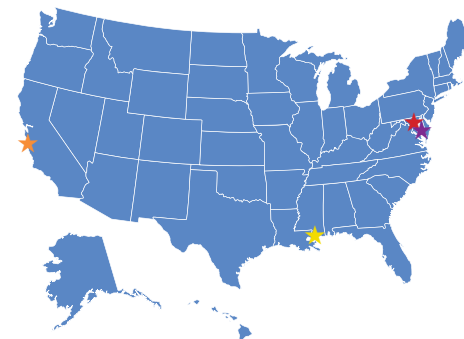
Major Locations

NRL is headquartered in Washington, D.C. Additional sites are located Stennis Space Center (SCC), Mississippi (NRL-SSC); Monterey, California (Marine Meteorological Division); and Patuxent River, Maryland (VXS-1, U.S. Navy's airborne S&T research squadron).

Contact Information

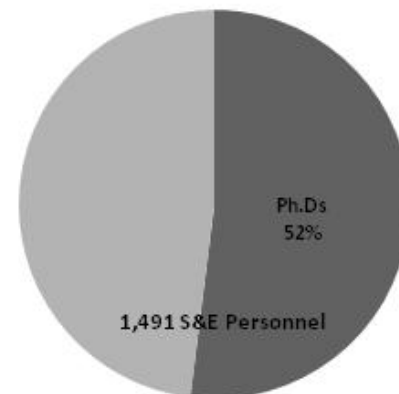
NRL Public Affairs Office
U.S. Naval Research Lab 4555 Overlook Ave.
SW Washington, DC 20375
Phone: (202)-767-2541
Email: info@pao.nrl.navy.mil

NRL Sites

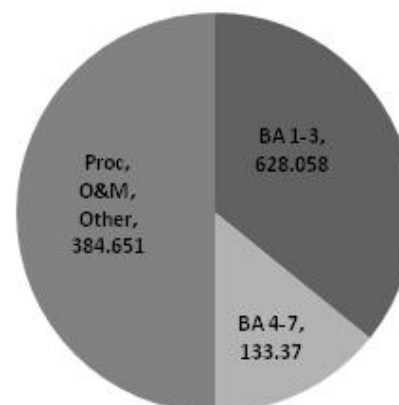


- ★ Washington, DC
- ★ Mississippi
- ★ Monterey, California
- ★ Patuxent River, Maryland

Human Capital 2010 (total Number)



Budget FY09 (\$ Millions)



Naval Surface Warfare Center (NSWC)

- Carderock West Bethesda, MD



For over 100 years, Carderock has helped preserve and enhance the nations presence and under the seas. Carderock is a full-spectrum research and development, test and evaluation, engineering, and Fleet support organization for the Navy's ships, submarines, military watercraft, and unmanned vehicles with insight into new concepts and technologies for the Navy Fleet of the 21st Century.

NSWC Carderock consists of approximately 3,200 scientists, engineers and support personnel working in more than 40 disciplines ranging from fundamental science to applied/in-service engineering. We are the Navy's experts for maritime technology. The Division houses world-class facilities and laboratories. Carderock's Headquarters is located in West Bethesda, Maryland. A major operating site is located in Philadelphia and is recognized as the center for naval machinery. The Division also conducts research and development at several remote sites across the country.

As a major component and field activity of the Naval Sea Systems Command, the Carderock Division provides cradle-to-grave support for its technical products over an enormous range of scientific areas related to surface and undersea platforms. The Division addresses the full spectrum of applied maritime science and technology, from the theoretical and conceptual beginnings, through design and acquisition, to implementation and follow-on engineering. This includes all technical aspects of improving the performance of ships, submarines, military water craft, and unmanned vehicles, as well as research for military logistics systems. In addition, the Division is uniquely chartered by Congress to support America's maritime industry.

Mission

To provide research, development, test and evaluation, analysis, acquisition support, in-service engineering, logistics, and integration of surface and undersea vehicles and associated systems. Develop and apply science and technology associated with naval architecture and marine engineering, and provide support to the maritime industry.

Core Technical Competencies

- Ship and Submarine Design and Integration
- Ship and Submarine Acquisition Engineering
- Ship and Submarine System Concepts, Technologies and Processes
- Surface and Undersea Vehical Machinery Systems Integration (Phil.)
- Combatant Craft & Marine Corps Vehicles
- Unmanned Vehicles Naval Architecture and Marine Engineering
- Hull Forms and Fluid Dynamics
- Propulsors
- Surface & Undersea Vehicle Mechanical Power & Propulsion Systems (Phil.)
- Surface & Undersea Vehicle Electrical Power & Propulsion Systems (Phil.)
- Surface & Undersea Vehicle Auxiliary Machinery Systems (Phil.)
- Surface & Undersea Vehicle Hull, Deck, and Habitability Machinery Systems (Phil.)



Advanced Electric Ship Demonstrator





NSWC - Carderock Division

West Bethesda, MD

- Surface & Undersea Vehicle Machinery Automation, Controls, Sensors and Network Systems (Phil.)
- Surface, Undersea, and Weapon Vehicle Materials
- Surface & Undersea Vehicle Structures
- Alternative Energy & Power Sources R&D
- Advanced Logistics Concepts and HM&E Life Cycle Logistics Support
- Surface, Undersea and USMC Vehicle Vulnerability Reduction and Protection
- Surface and Undersea Vehicle Underwater Signatures, Silencing Systems, and Susceptibility
- Surface and Undersea Vehicle Non-Acoustic Topside Signatures, Silencing Systems, and Susceptibility

Major Facilities

- William B. Morgan Large Cavitation Channel (Memphis, TN)
- South Florida Ocean Measurement Facility in (Fort Lauderdale, FL)
- Southeast Alaska Acoustic Measurement Facility (SEAFAC) (Ketchikan, AK)
- Anechoic Flow Facility (West Bethesda, MD)
- David Taylor Model Basin (West Bethesda, MD)
- Magnetic Materials Laboratory (West Bethesda, MD)
- Maneuvering and Seakeeping Facility (West Bethesda, MD)
- Model Fabrication Facility (West Bethesda, MD)
- Ship Materials Technical Center (SMTC) (West Bethesda, MD)
- Structures Evaluation Laboratory (West Bethesda, MD)
- Test Pond (West Bethesda, MD)
- Advanced Shipboard Machinery Systems Complex (Philadelphia, PA)
- Cargo and Weapons Handling Systems Complex (Philadelphia, PA)

- Diesel Engine RDT&E Complex (Philadelphia, PA)
- Electrical Machinery Systems Complex (Philadelphia, PA)
- Gas Turbine Ship Systems RDT&E Complex ((Philadelphia, PA)
- Machinery Acoustic Silencing Complex (Philadelphia, PA)
- Mission Support Complex (Philadelphia, PA)
- Sensors, Wireless and Video Systems and Calibration Facility (Philadelphia, PA)
- Steam Propulsion Systems Test Complex (Philadelphia, PA)

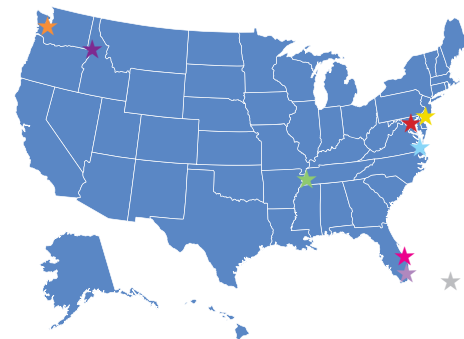
Major Locations

NSWC Carderock is headquartered in Bethesda, Maryland. Additional sites are located in Silverdale, Washington (Bangor Detachment); Bayview, Idaho (Acoustic Research Detachment); Philadelphia, Pennsylvania (Ship Systems Engineering Station); Patuxent River, Maryland (Special Trials Facility); Norfolk, Virginia (Combatant Craft Division); Port Canaveral, Florida (Acoustic Trials Detachment); Fort Lauderdale, Florida (South Florida Testing Facility); Panama City, Florida (Research Vessels); Memphis, Tennessee (Memphis Detachment – Large Cavitation Channel); and Ketchikan, Alaska (Southeast Alaska Acoustic Measurement Facility).

Contact Information

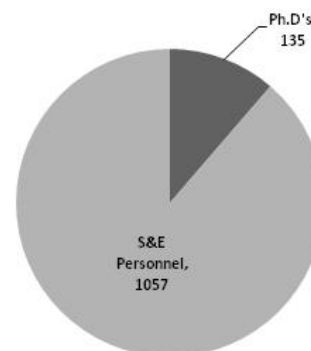
NSWC Carderock Congressional and Public Affairs Office
9500 MacArthur Blvd
West Bethesda, MD 20817-5700
Phone: (301)-227-4465
Email: CRDIVCPAO@navy.mil
Website: <http://www.navsea.navy.mil/nswc/carderock/default.aspx>

NSWC Carderock Sites

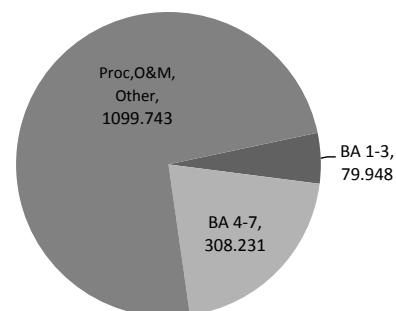


- ★ Carderock West Bethesda, MD
- ★ Ship Systems Engineering, Philadelphia, PA
- Category 1 Detachments:
- ★ Puget Sound Detachment, Bangor, WA
- ★ Acoustic Research Detachment, Bayview, ID
- ★ Large Cavitation Channel, Memphis, TN
- ★ Combatant Craft Division, Norfolk, VA
- ★ Acoustics Trials Detachment, Cape Canaveral, FL
- ★ South Florida Testing Facility, Ft. Lauderdale, FL
- ★ South TOTO Acoustic Measurement Facility, Andros Island, Bahamas

Human Capital 2010 (total Number)



Budget FY09 (\$ Millions)



NSWC - Corona Division

Corona, CA



Corona is the Navy's only independent analysis and assessment center, employing highly specialized scientists and engineers, the so-called "Corona Engineers." As the lead analysis agent for Navy surface ship combat systems, Corona has refined a unique collaborative analysis process that utilizes the talents of a wide array of government and contractor agencies. Corona has the data collection and transmission infrastructure at the primary Fleet ranges and the engineering skills needed to define and prioritize data necessary for rapid, on-range feedback of test and exercise results.

Corona provides the following capabilities:

- Integrated performance and readiness assessment of weapons and combat systems
- Range instrumentation management and engineering
- Test systems effectiveness and their measurement integrity
- Weapons and combat systems product integrity
- Corona is one of the nodes for the Distributed Engineering Plant (DEP)

Independent Assessment Pillars

- Trusted agent for Commander, Operational Test and Evaluation Force (COTF) analysis and assessment.
- Connectivity with worldwide presence to Test & Evaluation (T&E), Missile Defense Agency (MDA), Joint National Training Capability (JNTC), and Fleet training sites to enable analysis and reporting of assessment results in near real time.
- Disciplined assessment, quality, and measurement programs for Navy and joint commands.
- Measurement standards and assessment requirements to support emerging and in-service weapon systems with expertise in developing range and test instrumentation to support T&E and fleet training.

Mission

Serve warfighters and program managers as the Navy's independent performance assessment agent throughout systems' lifecycles by gauging the Navy's warfighting capability of weapons and integrated combat systems, from unit to force level, through assessment of those systems' performance, readiness, quality, supportability, and the adequacy of training. Execute other responsibilities as assigned by the Commander, Naval Surface Warfare Center.



NSWC Corona manages and operates the Strategic Systems Programs' Trouble and Failure Report (TFR) Program for the TRIDENT Weapon System



NSWC Corona is the certification agent for all gun barrel gages used by the Pacific and Atlantic Fleets, such as the 5"/54 Mark 45 Mod 2 above



Corona technician using a laser





NSWC - Corona Division

Corona, CA



Under the auspices of the Assessment Program for NATO SEASPARROW Surface Missile System, NSWC Corona provides flight analysis services for nearly every member of the NATO Consortium

Core Technical Competencies

- Warfare Systems Performance and Readiness Assessment
- Quality and Mission Assurance Assessment
- Metrology, Test, and Monitoring Systems Assessment
- Force Training Assessment
- Weapons Systems Interface Assessment

Major Facilities

- Joint Warfare Assessment Laboratory and Center
- Measurement and Science Technology Laboratory

Contact Information

For additional information, please contact:
NSWC, Corona Division Office of Corporate Communications
P.O. Box 5000
Corona, CA 92878-5000
Phone: 951-273-5137
Email: corona.info@navy.mil
Web: <http://www.navsea.navy.mil/nswc/corona/default.aspx>

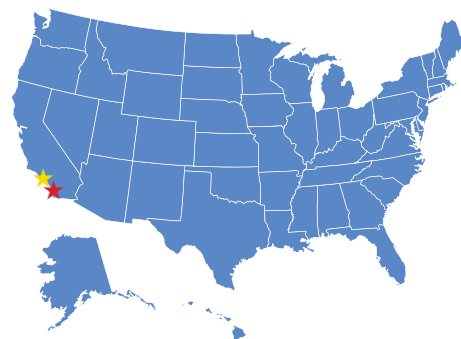


NSWC Corona staff confer as combat systems ship qualification trials for the Navy's newest Arleigh Burke-class guided-missile destroyers USS Gravelly and USS Jason Dunham are conducted in the Atlantic Ocean. NSWC Corona oversaw collaborative analysis teams at the Navy's Joint Warfare Assessment Laboratory marking the ships' latest live-fire missile exercises with installed Aegis combat system upgrades



Corona technician installing fiber optic cable

NSWC Corona Sites

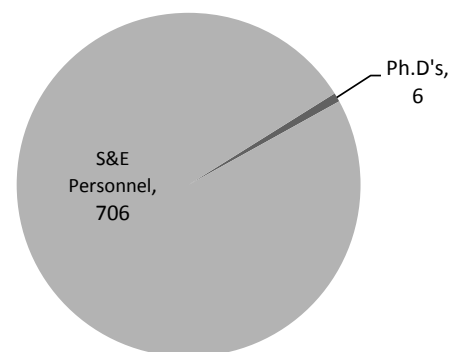


★ Corona, Norco, California

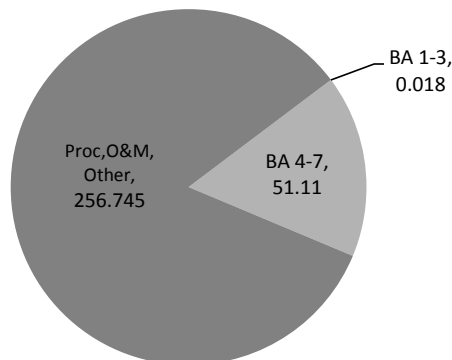
Category 1 Detachments:

★ South Beach Detachment, California

Human Capital 2010 (total Number)



Budget FY09 (\$ Millions)



NSWC - Crane Division

Crane, IN



Located in the nation's heartland, Naval Surface Warfare Center (NSWC) Crane's total focus is to support the warfighter by leveraging technical capabilities for the rapidly changing combat environment. Anchored by technical expertise, preeminent facilities, a strong work ethic and total lifecycle leadership, Crane provides comprehensive customer service, delivering timely, affordable, and quality solutions for Electronic Warfare/ Information Operations (EW/IO), Special Missions and Strategic Missions.

As the NAVSEA Center of Excellence for Electronic Warfare, Crane has a critical mass of co-located personnel and secured facilities that provide responsive, affordable, total lifecycle leadership. Crane's experts are innovators of leading-edge technical solutions employed by Air, Ground, and Maritime Domains for the joint and coalition forces. Crane is known for rapid transition of technology, integrating threat assessment, proven solutions and risk management with product deployment and training.

Crane's Strategic Missions team delivers innovative technical solutions to deter and defend against aggression and defeat threats worldwide. Crane's Strategic Missions experts and preeminent facilities provide high reliability electronics and sensors for successful global deterrence and ballistic missile defense. Every ballistic missile in US arsenal carries key components developed or supported by Crane. Crane is dedicated to developing and deploying the technology that ensures that weapons systems are fully reliable and always available to the warfighter.

Mission

Provide acquisition engineering, in-service engineering and technical support for sensors, electronics, electronic warfare and special warfare weapons. Apply component and system level product and industrial engineering



The USS Kidd is equipped with the AN/SLQ-32(V) electronic warfare (EW) system, which NSWC Crane has supported since 1984



NSWC Crane provides the Sea-Based X-Band (SBX) Radar Navy Transition Office with Integrated Product Team leadership in acquisition engineering, life-cycle engineering as well as operations and sustainment of the SBX Missions Systems, X-Band Radar and Physical Security





NSWC - Crane Division

Crane, IN

to surface sensors, strategic systems, special warfare devices and electronic warfare/information operations systems. Execute other responsibilities as assigned by the Commander, Naval Surface Warfare Center.

Core Technical Competencies

- Strategic Systems Hardware Engineering, AE, & Sustainment
- Special Operations Hardware In-Service Engineer, Procurement & Sustainment
- EW Systems RDT&E/Acquisition/Sustainment
- Radar Component Sustainment
- Energy & Power Source AE, ISE, T&E & Sustainment
- Acoustic Sensors AE, ISE & Sustainment
- Microwave Technologies RDT&E, AE & Sustainment
- Microelectronic Technologies RDT&E, AE, & Sustainment
- Infrared Countermeasures and Pyrotechnic RT&E and Sustainment
- Defense Security Systems AE, ISE and Sustainment
- Navy Electronics Depot
- Electro-Optic, AE, ISE & Sustainment
- Obsolescence Management

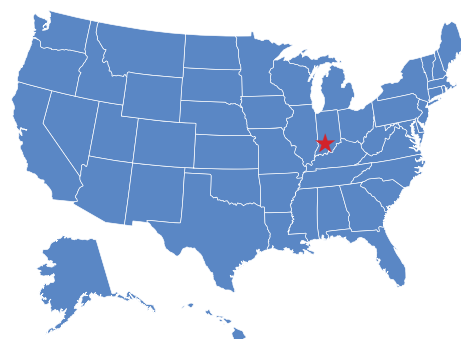
Major Facilities

- Strategic Weapons Systems Engineering and Evaluation Complex
- Electronic Warfare Systems Engineering Complex
- Special Operations Weapons Engineering and Test Facility
- Environmental and Nondestructive Test Complex
- Pyrotechnic Technology Complex
- Sustainment Engineering Technology Complex
- Expeditionary Warfare Systems Integration Facility
- Electrochemical Power Sources Engineering and Evaluation Complex
- Electro-Optics Engineering and Test Facility
- Microwave and Radar Systems Engineering Complex

Contact Information

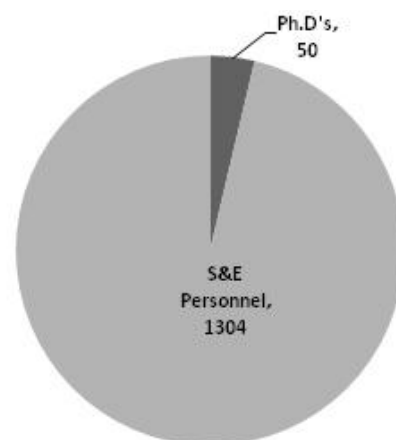
For additional information, please contact:
NSWC Crane Division
300 HWY 361, Crane, IN 47522
Website: <http://www.navsea.navy.mil/nswc/crane/default.aspx>

NSWC Crane Sites

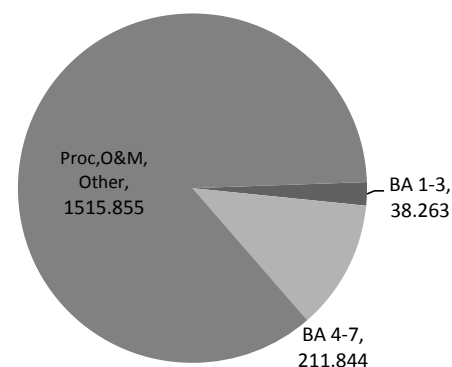


★ Crane, Indiana

Human Capital 2010 (total Number)



Budget FY09 (\$ Millions)



Every ballistic missile (such as the Trident II D5 above) in the U.S. arsenal carries key components designed, developed or sustained by NSWC Crane's Strategic Missions Center



NSWC - Dahlgren Division

Dahlgren, VA



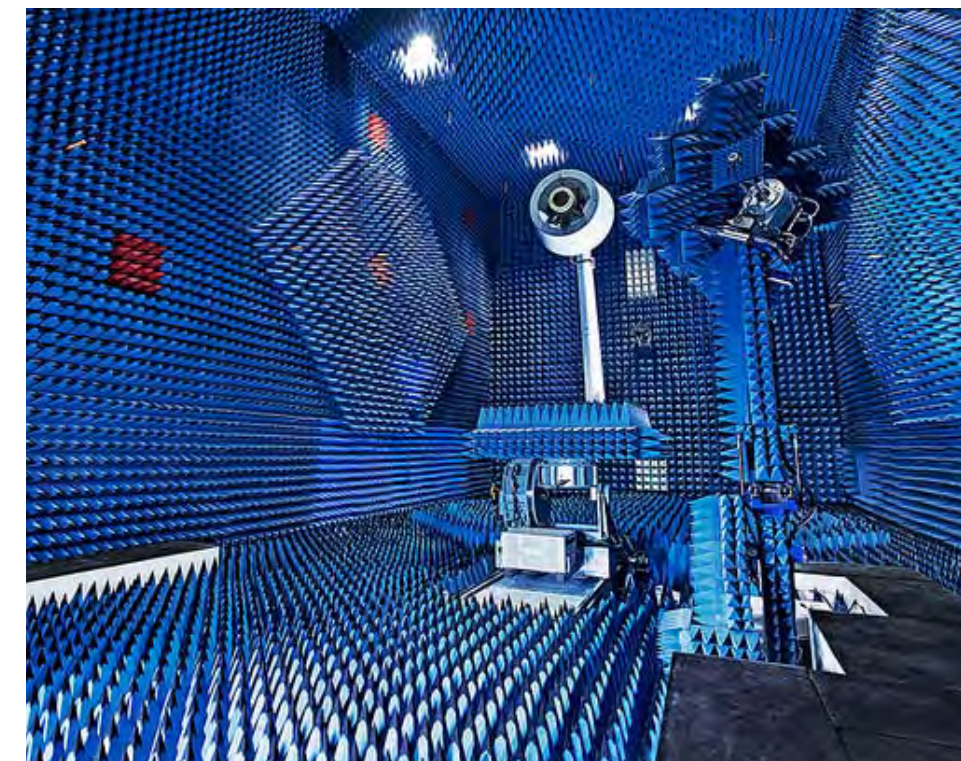
Naval Surface Warfare Center (NSWC) Dahlgren translates the warfighter's needs into technical solutions within an operational context for the nation by developing and supporting systems, technologies, concepts and tactics that enable military forces to conduct their missions safely and effectively across the complete spectrum of operations.

Through commitment to technical competence and forward-looking strategies, Dahlgren provides the science, technology, and engineering bridge between the requirements and challenges of the warfighter, and the industrial capabilities and capacities of our private-sector partners. The critical linkage results in the highest quality, affordable and timely warfighting capabilities being provided to our men and women in uniform as guided by the following principles:

- A unified Navy Laboratory that is part of the larger Department of Defense (DoD) team.
- People and their competence are fundamental to their success.
- Quality and affordable products and services are the foundation for customer satisfaction.
- Processes and products are developed from a systems' perspective
- Responsible stewardship of personnel, information, and environmental resources is vital to our future.



Using the prototype version of the Surface Navy Laser Weapon System (LaWS) Naval Sea Systems Command (NAVSEA), with support from NSWC Dahlgren, for the first time successfully tracked, engaged, and destroyed a threat representative unmanned aerial vehicle (UAV) while in flight



The Link-16, AS-4127A maritime antenna is tested with compact range equipment in the specialized antenna anechoic chamber at the new Surface Sensors and Combat Systems Facility at Naval Surface Warfare Center (NSWC) Dahlgren



Almost every naval gun barrel (such as that of the 57 mm gun above) comes to Dahlgren for testing before going to the fleet





NSWC - Dahlgren Division Dahlgren, VA

NSWC Dahlgren is a shore command of the U.S. Navy under the Naval Sea Systems Command (NAVSEA), which engineers, builds and supports America's Fleet of ships and combat systems.

Mission

Provide research, development, test and evaluation, analysis, systems engineering, integration and certification of complex naval warfare systems related to surface warfare, strategic systems, combat and weapons systems associated with surface warfare. Provide system integration and certification for weapons, combat systems and warfare systems. Execute other responsibilities as assigned by the Commander, Naval Surface Warfare Center.

Core Technical Competencies

- Force & Surface Platform Level Warfare Systems Analysis & Modeling (DL)
- Weapon Systems Analysis, Effects, & Effectiveness (DL)
- Radar and Electro-Optic Systems RDT&E (DL)
- Surface Warfare Systems Engineering & Integration RDT&E
- Surface Combat Control Systems S&T, RDT&E (DL)
- Surface Conventional Weapon Control Systems RDT&E (DL)
- Human Systems Integration Science and Engineering
- Missile Systems Integration (DL)
- Surface Conventional and Electromagnetic Gun Systems RDT&E (DL)
- Directed Energy Systems RDT&E (DL)
- Weaponization of Surface & Air Unmanned Systems (DL)
- Marine Corps and Other Weaponry Systems RDT&E (DL)
- Surface Electronic Warfare Systems Architecture and Combat Systems
- Chemical, Biological and Radiological Warfare Defense Systems RDT&E
- National Response Missions, Including Homeland Security and Defense (DL)

- Force Level Warfare Systems Engineering and Integration
- Force Level Warfare Systems Interoperability Engineering
- Integrated Surface Combat Control Systems Support (DN)
- Integrated Training Systems (DN)
- Radar Distribution Systems (DN)
- Joint Command and Control Systems Integration and Architecture Development (DN)

Major Facilities

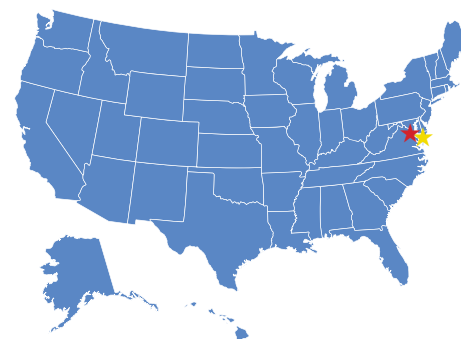
- Integrated Training Capabilities Complex (Dam Neck)
- Force Integration and Interoperability Complex (Dam Neck)
- Integrated Combat Control Systems Complex (Dam Neck)
- Information and Special Warfare Systems Complex (Dam Neck)
- Chemical Biological Detection Center
- Distributed Engineering Plant
- Electromagnetic Railgun Launch Facility
- Explosive Experimental Area
- E3 Facilities
- Integrated Command Environment Lab
- Maginot Open Air Test Site
- Mission Assurance Operation Center
- National Innovative Technology and Mission Assurance Center
- Open Architecture Computing Facility
- Potomac River Test Range
- Search and Track Sensor Test Site
- Land Based Test Site
- Multi-National Distributions Operations Center

Contact Information

For additional information, please contact:
Dahlgren Location:
Corporate Communications Office
Telephone: (540) 653-8152
Email: DLGR_NSWC_C6@navy.mil
Website: <http://www.navsea.navy.mil/nswc/dahlgren/default.aspx>

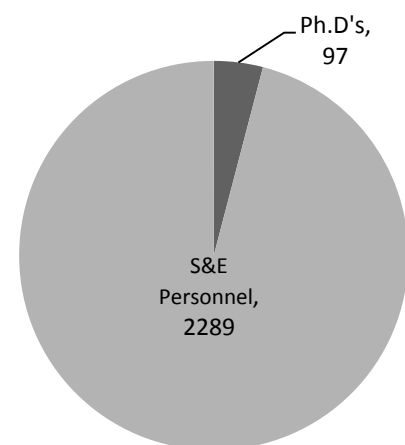
Dam Neck Location: Public Affairs Office
Telephone: (757) 492-6155
Email: nswcdnpao@navy.mil

NSWC Dahlgren Sites

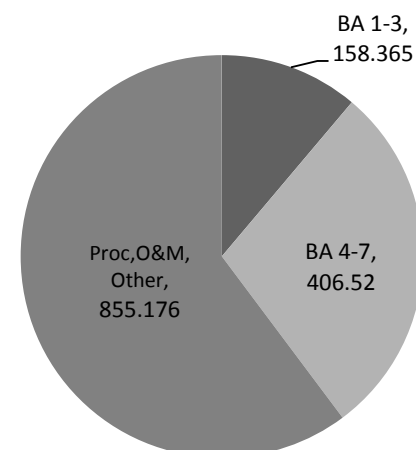


- ★ Dahlgren, Virginia
- ★ Dam Neck

Human Capital 2010 (total Number)



Budget FY09 (\$ Millions)



NSWC - Naval Explosive Ordnance Disposal Technology Division Indian Head, MD



The Naval Surface Warfare Center (NSWC) Naval Explosive Ordnance Disposal Technology Division (NAVEODTECHDIV) traces its origin back to World War II when the U.S. Navy recognized the need for countering advanced and complex weapons systems being deployed by other nations. Representing the largest concentration of EOD knowledge in the world, its mission is more relevant today than ever before. Ongoing global events and evolving threats have reemphasized how critical our mission is to homeland defense and the warfighter.

Joint Service EOD technicians deploy around the globe in response to incidents involving conventional and unconventional, improvised, chemical, biological, and nuclear ordnance to include Improvised Explosive Devices and Weapons of Mass Destruction. To provide EOD technicians with the information and tools they need to eliminate those explosive threats, the NAVEODTECHDIV employs mechanical and electrical engineers, information technology and intelligence specialists, physicists and chemists, as well as a host of experts in related fields.

We use multi-disciplinary teams to conduct research and develop tools in a broad range of fields from information technologies and energetic materials to robotics and laser technologies, all in support of the EOD operator. Whether it be by reverse engineering existing ordnance and creating the procedures to make them safe, or spearheading the development of tools and technologies to counter emerging threats, we are focused on exploiting technology and intelligence to develop and deliver tools and equipment, and their life cycle support to the joint service EOD operating forces and other customers.

Mission

Exploit technology and intelligence and provide the forces needed to develop and deliver Explosive Ordnance Disposal



Navy diver practices defusing a mine



Engineers use computer simulation to predict the blast radius of an improvised explosive device (IED)



Technician moving explosive material





NSWC - Naval Explosive Ordnance Disposal Technology Division Indian Head, MD



US Navy EOD Technician

(EOD) information, tools, equipment and their life cycle support to meet the needs of Joint Service EOD operating forces and Combatant Commanders.

Core Technical Competencies

- Technology Development and Integration for EOD, IED, and CREW
- C-IED Technology
- C-IED Information
- EOD Technology
- EOD Information
- Crew Tech
- Crew Info

Major Facilities

- Ordnance Exploitation Complex and Magazine Storage Facilities
- Hypervelocity Test Facility
- Magnetic Signature Test Facility
- Explosive Test Range

Major Locations

NSWC EOD Tech is located at Indian Head, Maryland.

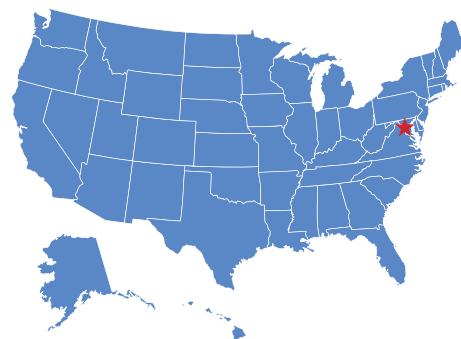


Buffalo Mine Protected Vehicle (Counter IED Vehicle)

Contact Information

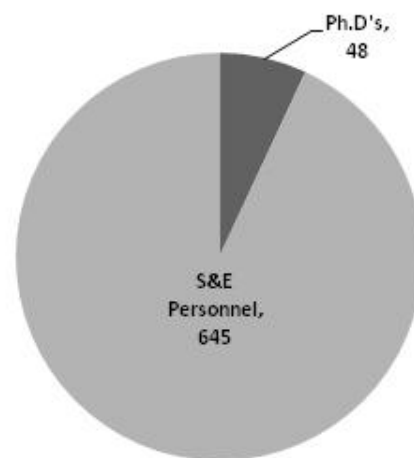
NAVEODTECHDIV Code AC-PAO
2008 Stump Neck Road
Indian Head, MD 20640-5070
Email: eodtechdiv_pao@navy.mil
Website: <http://www.navsea.navy.mil/nswc/eodtechdiv/default.aspx>

NSWC EOD Tech Sites

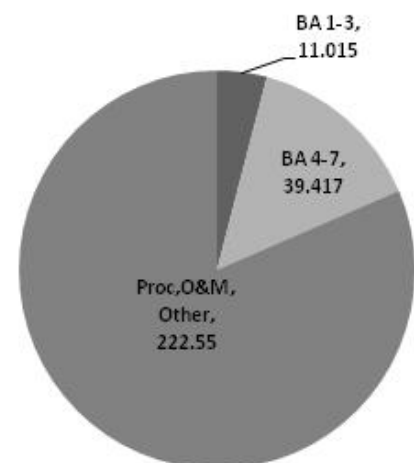


★ Indian Head, Maryland

Human Capital 2010 (total Number)



Budget FY09 (\$ Millions)



NSWC - Indian Head Division Indian Head, MD



As a Department of Defense (DoD) Energetics Center, Naval Surface Warfare Center (NSWC) Indian Head Division is a critical component of the Warfare Center (WFC) Enterprise. One of eight Divisions, Indian Head's mission is to research, develop, test, evaluate, and produce energetics and energetic systems for our fighting forces around the globe.

Energetics are explosives, propellants, pyrotechnics, reactive materials, related chemicals and fuels and their application in propulsion systems and ordnance. As the largest DoD full spectrum energetics enterprise, NSWC Indian Head employs a workforce of over 1,200, of which more than 850 are scientists, engineers, and technicians dedicated to every aspect of developing and sustaining explosives, propellants, pyrotechnics, high-energy chemicals and their application to warfighting systems. In addition, NSWC Indian Head has the largest concentration of PhDs (59) working in Energetics in the WFC, including the highest number of synthesis chemists, detonation physicists, and formulation scientists dedicated to the energetics National competency.

The Division's unique synergy and balanced capabilities address all aspects of the Energetics technical discipline, including basic research, applied technology, technology demonstration, prototyping, engineering development, acquisition, low-rate production, in-service engineering/mishaps and failure investigations, surveillance, and demilitarization.

If the military experience problems with current weapon systems, or encounter new threats on the battlefield, Indian Head Division collaborates and provides the appropriate solution. As the Navy's lead technical authority in the U.S., NSWC Indian Head performs over sixty percent of all Navy energetics workload, and has an unmatched record of 13 Navy-qualified explosives transitioned into 47 Navy, Army, Air Force, and Marine Corps weapons. Seventy-five percent of all explosives deployed in U.S. weapons were developed by NSWC Indian Head.

Mission

Provide research, development, test and evaluation and in-service support of energetics and energetic materials for warheads, propulsion systems, ordnance and pyrotechnic



NSWC Indian Head specializes in Cartridge Actuated and Propulsion Actuated Devices (CADs & PADs) such as this Aircrew Escape Propulsion System (AEPS)



NSWC Indian Head designs missile propulsion systems for weapons such as the Tomahawk cruise missile being launched in this photo





NSWC - Indian Head Division

Indian Head, MD

devices and fuzing for Navy, Joint Forces, and the Nation, to include research, test, and engineering of chemicals, propellants, explosives, related electronic devices, associated ordnance equipment and special weapons support. Execute other responsibilities as assigned by the Commander, Naval Surface Warfare Center.

Core Technical Competencies (ISE, T&E, and ILS)

- Energetic Systems RDT&E, AE, ISE and Sustainment
- Energetic Systems and Material Scale-up, Manufacture and Manufacturing Technology
- Cartridge Actuated Devices, Cutters, Sounding and Specialty Devices RDT&E, AE, ISE, Sustainment, and Manufacturing
- Weapon Simulators, Trainers, Training, Test and Diagnostic Equipment RDT&E, AE, ISE, and Sustainment
- Energetic Safety, Environmental Technology, Logistics, and PHST (Packaging/Handling / Storage and Transportation) RDT&E, AE, ISE and Sustainment
- Conventional Ammunition Engineering and Sustainment
- Gun Systems ISE, T&E and ILS

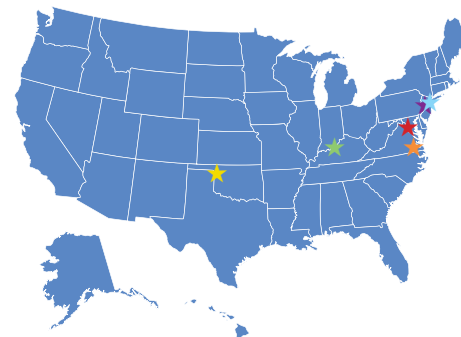
Major Facilities

- Aircrew Escape Ordnance Devices Development & Prototyping Complex
- Detonation Physics RDT&E and Acquisition
 - Bombproofs, blast chambers, self-contained gun ranges
- Continuous Twin-Screw Processing R&D and Scale-up
 - 20-mm, 37-mm, 40-mm and 88-mm extruders
- Novel Materials R&D
 - Nano-energetic materials characterization
 - Complete suite of analytical capabilities



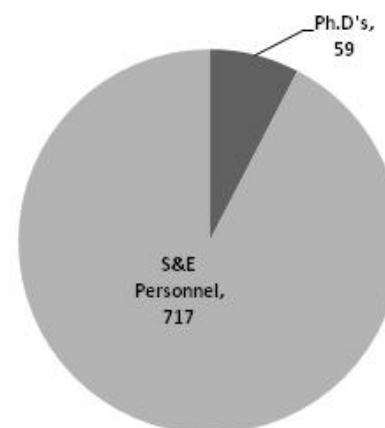
A technician prepares a Tomahawk missile for ground testing

NSWC Indian Head Sites

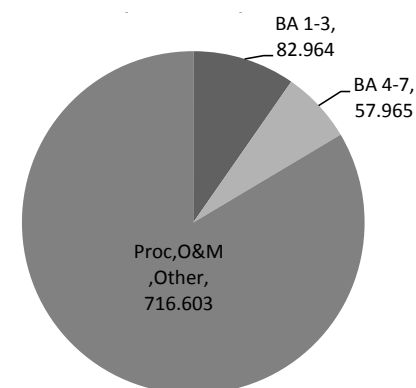


- ★ Indian Head, Maryland
- ★ Louisville, Kentucky
- ★ Picatinny, New Jersey
- ★ Category 1 Detachments:
- ★ McAlester Detachment, Oklahoma
- ★ Yorktown Detachment, Virginia
- ★ Earle Detachment, New Jersey

Human Capital 2010 (total Number)



Budget FY09 (\$ Millions)



Contact Information

For additional information, please contact:
 NSWC Indian Head Public Affairs Office
 3767 Strauss Ave., Suite 113, Bldg. 20
 Indian Head, MD 20640-5150
 Telephone: 301-744-6504
 Email: ihdiv.nswc.pao@navy.mil
 Website: <http://www.navsea.navy.mil/nswc/indianhead/default.aspx>



NSWC - Panama City Division

Panama City, FL

Located on over 650 acres along St. Andrew Bay in Panama City, Florida, Naval Surface Warfare Center (NSWC) Panama City Division is the Navy's premier organization responsible for research, development, test and evaluation (RDT&E) of systems applicable to littoral warfare and coastal operations. The Division specifically focuses on RDT&E in the areas of mine warfare, expeditionary maneuver warfare, special operations, diving and life support, and other missions that take place in the coastal region.

Mission

To conduct research, development, test and evaluation and in-service support of mine warfare systems, mines, naval special warfare systems, diving and life support systems, amphibious/expeditionary maneuver warfare systems and other missions that occur primarily in coastal (littoral) regions.

Core Technical Competencies

- RDT&E for Navy, Joint, and other agency diving and life-support systems
- RDT&E and systems engineering of mine warfare/mine countermeasure systems, amphibious warfare systems, and Naval special warfare systems
- Chemical & Biological Warfare Individual Protection Systems
- Expeditionary Coastal & Maritime Security Systems Engineering & Integration
- Air Cushion Vehicle Systems
- Expeditionary Maneuver Warfare Systems Engineering and Integration
- Special Warfare Maritime Mobility, Mission Systems & Mission Support Equipment
- MCM Detect & Engage Systems, Modular Mission Packaging, and Platform Integration & Handling
- Littoral Mission Systems Integration and Modular Mission Packages Certification
- Unmanned Systems Engineering & Integration, Autonomous Operations, Joint Interoperability and Common Control
- Mine Sensor & Target Detection Technology, Mine Delivery Platform Integration and Minefield Architecture



NSWC Panama City has the facilities and technical expertise for full spectrum RDT&E and life cycle support of warfare systems and air cushion vehicles (ACV's) required by the Joint Forces to conduct EMW and seabasing missions



NSWC Panama City capabilities encompass the full spectrum of RDT&E, acquisition support, and man-rated ISE for the Navy's underwater diving life support systems





NSWC - Panama City Division

Panama City, FL

- Diving & Diving Support Systems
- Surface Life Support Systems for Extreme Environments

Major Facilities

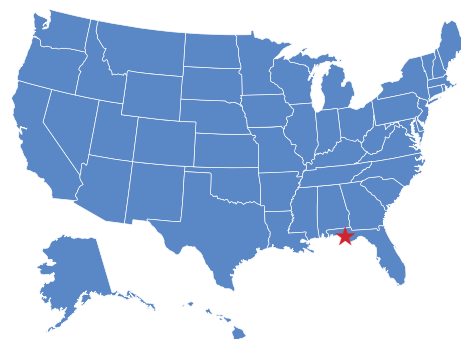
- Diving & Life Support Complex
- Mine Warfare Complex
- Special Warfare Research & Engineering Complex
- Expeditionary Warfare Complex
- Landing Craft Air Cushion Facility
- Human Systems Integration Useability Lab

- USMC Amphibious Raids and Reconnaissance Integration Facility
- Coastal Test Range
- Prototype Fabrication Facility

Contact Information

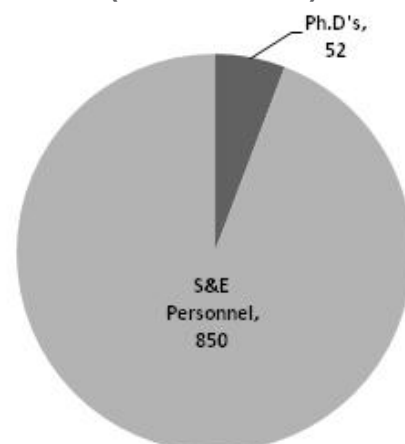
For additional information, please contact:
NSWC Panama City Division
110 Vernon Avenue
Panama City, FL 32407-7001
Telephone: 850-230-7400
Website: <http://www.navsea.navy.mil/nswc/panamacity/default.aspx>

NSWC Panama City Sites

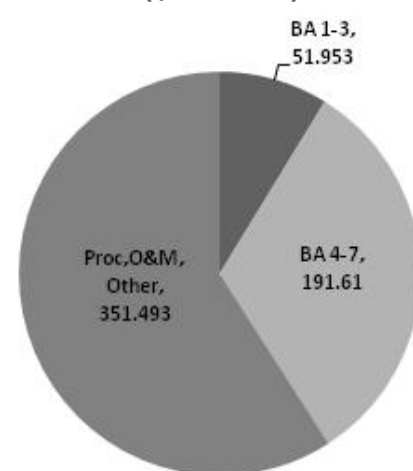


★ Panama City, Florida

Human Capital 2010 (total Number)



Budget FY09 (\$ Millions)



ASDS (Advanced SEAL Delivery System)



MH-60 Seahawk



NSWC - Port Hueneme Division

Port Hueneme, CA

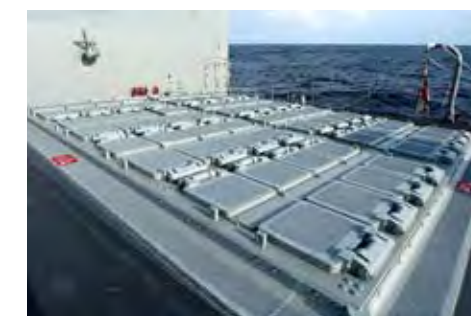
Naval Surface Warfare Center (NSWC) Port Hueneme maintains technical expertise at four locations across the U.S.: Engineering and Logistics at Port Hueneme, California; Search Radar Engineering at Virginia Beach, Virginia; Gun Weapon Systems support at Louisville, Kentucky; Live Fire Testing at White Sands, New Mexico. Port Hueneme is recognized as the Navy's Center of Excellence for In-Service Engineering, Test and Evaluation, and Integrated Logistics Support for surface warfare combat and weapon systems. Since its inception in 1963, NSWC Port Hueneme has been supporting the combat and weapon systems of the Fleet by providing highly skilled personnel and state-of-the-art facilities to lead the development and support of US Navy surface ship warfare systems throughout their life cycles. Port Hueneme is focusing its technical capabilities on Next Generation In-Service Engineering, which involves direct connectivity to the Fleet on a global basis and the immediate availability of round-the-clock access to products, services, and Fleet support capabilities. Next-Generation In-Service



A topside view of the forward MK-41 Vertical Launching System (VLS)



Phalanx CIWS weapons system



MK 49 Guided Missile Launching System (GMLS)



USS Freedom





NSWC - Port Hueneme Division

Port Hueneme, CA

Engineering will support predictive system failure, remote diagnostics, and corrective action via real-time, networked communications.

Mission

Provide test and evaluation, systems engineering, integrated logistics support, in-service engineering and integration of surface ship weapons, combat systems and warfare systems. Provide the leading interface to the surface force for in-service maintenance and engineering support provided by the Warfare Centers. Execute other responsibilities as assigned by the Commander, Naval Surface Warfare Center.

Core Technical Competencies: In-Service Engineering and Test & Evaluation for

- Strike Force Interoperability and Theater Warfare Systems
- Surface Combat Systems
- Surface Weapon Systems
- Underway Replenishment Systems
- Surface Missile Systems

- Surface Missile Launcher Systems
- Radar Systems
- Directed Energy Systems

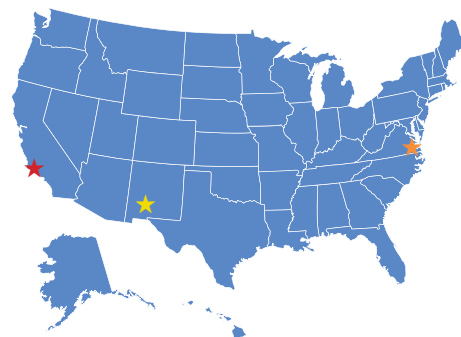
Major Facilities

- Engineering Development Lab
- Littoral Combat Ship Mission Package Support Facility
- Surface Warfare Engineering Facility
- Test Ship
- Underway Replenishment Test Site
- VLS Launcher Lab
- Desert Ship - White Sands, NM
- Mk 45 Magazine - Louisville, KY
- Radar Lab - Virginia Beach, VA

Contact Information

For additional information, please contact:
NSWC Port Hueneme Division
Command Communications Office
4363 Missile Way
Port Hueneme, CA 93043-4307
Email: prth.navsea.cco@navy.mil
Website: <http://www.navsea.navy.mil/nswc/porthueneme/default.aspx>

NSWC Port Hueneme Sites



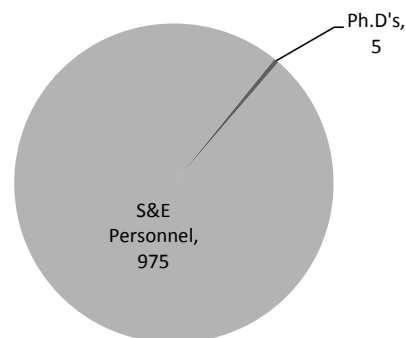
★ Port Hueneme, California

Category 1 Detachments:

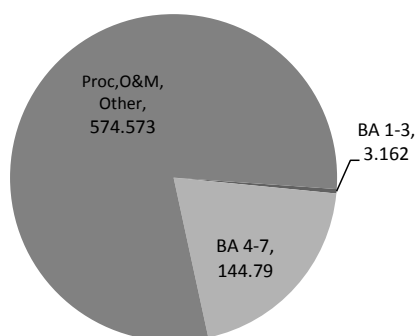
★ White Sands Detachment, New Mexico

★ Virginia Beach Detachment, Virginia

Human Capital 2010 (total Number)



Budget FY09 (\$ Millions)



Equipment being installed aboard the USS Freedom



Naval Undersea Warfare Center (NUWC) - Newport Division Newport, RI



Newport Division is responsible, cradle to grave, for all aspects of the systems under its charter, and it is engaged in efforts ranging from participation in fundamental research to the support of evolving operational capabilities in the Fleet. The major thrust of Newport Division's activities is in applied research and system development.

With headquarters in Rhode Island, Newport Division operates detachments at West Palm Beach, Florida, and Andros Island in the Bahamas. Remote test facilities are located at Seneca Lake and Fisher's Island in New York, and Dodge Pond, Connecticut.

Newport Division is a shore command of the US Navy under the Naval Sea Systems Command (NAVSEA) WFC Enterprise, which engineers, builds and supports America's Fleet of ships and combat systems. NAVSEA's world-class team of professionals provide virtual support anywhere and anytime to ensure the Fleet remains ready and capable - operating around the globe and keeping America's Navy #1 in the World.

Mission

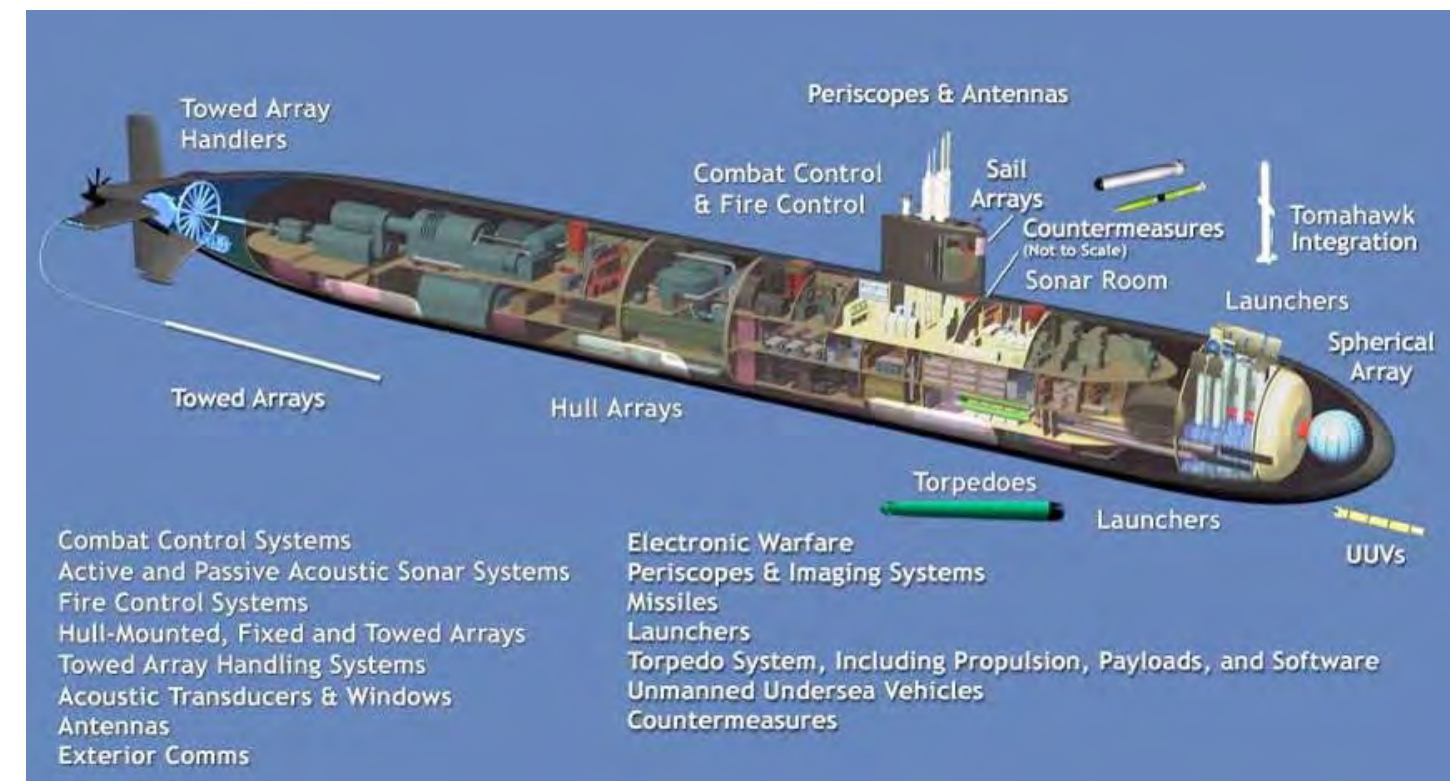
To provide research, development, test and evaluation, engineering, analysis and assessment, and fleet support capabilities for submarines, autonomous underwater systems, and offensive and defensive undersea weapon systems, and steward existing and emerging technologies in support of undersea warfare. Execute other responsibilities as assigned by the Commander, Naval Undersea Warfare Center.



Autonomous Undersea Vehicle (AUV)



Radio Frequency Tapered Anechoic Chamber



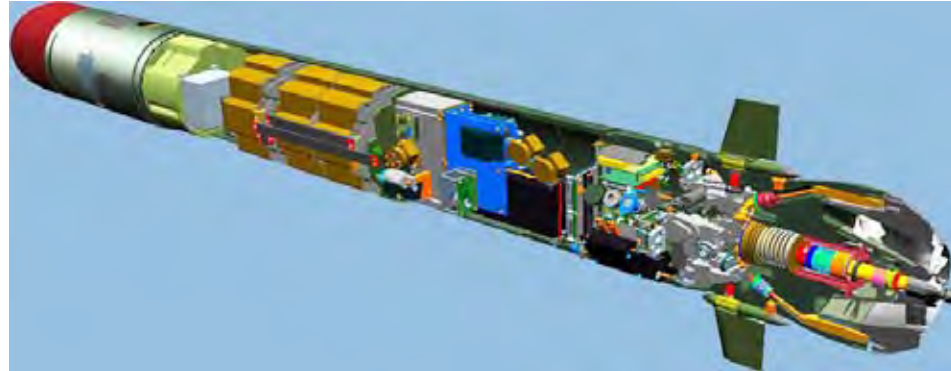
NUWC Newport's Contributions to Submarine Technology





NUWC - Newport Division

Newport, RI



Inside Look at a Torpedo

Vision

Undersea Superiority: Today and Tomorrow

Core Technical Competencies

- Submarine Exterior Communication Systems
- USW Communication Antenna Systems
- USW Combat Systems
- USW Trainer Systems
- USW Sensor and Sonar Systems
- Submarine Periscopes and USW Imaging Systems
- USW Electronic Warfare, SIGINT, IO Sensors & Systems Integration
- Undersea Surveillance Systems
- USW Launcher Systems & Payload Integration
- Submarine Tactical Missile Integration
- USW Autonomous Vehicles
- Torpedo and Sonar Defensive & Countermeasure Systems
- Torpedo Systems
- Undersea Warfare (USW) Analysis
- USW Environmental Assessment Effects Analysis
- Undersea Range Technology and Application
- Atlantic Range Management
- USW Test and Training Operations
- USW Systems Test and Evaluation
- USW Distributed Netted Systems

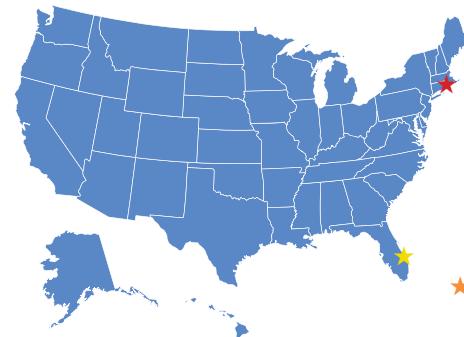
Major Facilities

- Acoustic Wind Tunnel
- Acoustic Anechoic Chamber
- Radio Frequency Tapered Anechoic Chamber
- Combat Systems Evaluation & Analysis Laboratory
- Launcher Laboratory
- Narragansett Bay Shallow Water Test Facility
- Over-water Arch Facility
- Propulsion Test Facility
- Quiet Water Tunnel
- Submarine Towed and Deployed Systems Research, Development, Test and Evaluation Complex
- Survivability Test Facility
- Undersea Warfare Analysis Laboratory

Contact Information

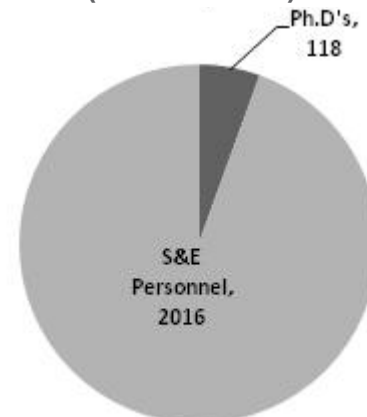
For additional information, please contact:
 NUWC Division Newport
 Public Affairs Office
 Phone: 401-832-7742
 Email: nuwc_npt_pao.fcm@navy.mil
 Website: <http://www.navsea.navy.mil/nuwc/newport>

NUWC Sites

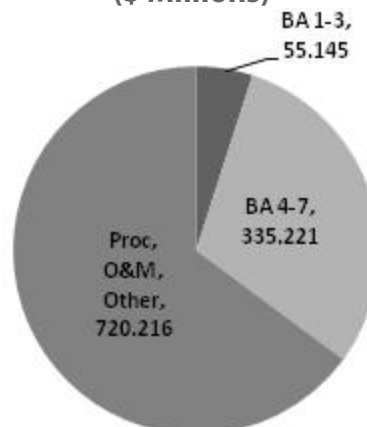


- ★ Newport, Rhode Island
- ★ Category 1 Detachments:
- ★ West Palm Beach Detachment, Florida
- ★ Andros Island Detachment, Bahamas

Human Capital 2010 (total Number)



Budget FY09 (\$ Millions)



NUWC - Keyport Division

Keyport, WA



Mission

Provide advanced technical capabilities for test and evaluation, in-service engineering, maintenance and industrial base support, fleet material readiness, and obsolescence management for undersea warfare. Execute other responsibilities as assigned by the Commander, Naval Undersea Warfare Center.

Brief History of the Directorate

With a proud history spanning nearly 100 years, Keyport provides technical leadership, engineering expertise, and unique facility complexes that serve to ensure sustainment of undersea warfare superiority for the United States and over 20 foreign allies. As one of two divisions of the Naval Undersea Warfare Center, Keyport's mission is focused on developing and applying advanced technical capabilities to test, evaluate, field, and maintain undersea warfare systems and related defense materials world-wide. These advance technical capabilities directly support the full spectrum of Navy undersea programs from science and technology research to in-service engineering support and Fleet operational readiness training.

Keyport's primary site is located in the state of Washington on the Puget Sound, about 10 miles west of the city of Seattle and just north of the city of Bremerton. Keyport also maintains strategically located detachments in Southern California and Hawaii, and an operating site in Guam, to provide ready support to Fleet operational forces at all major Navy home ports in the Pacific. An additional operating site in Hawthorne, Nevada, is used for storage and maintenance of undersea mines. Keyport's technical complexes are recognized national assets and include over 2.3 million square feet of specialized technical facilities and nearly 2000 square nautical miles of undersea ranges.

Our highly trained and diverse workforce of engineers, scientists, technicians, and industrial craftsmen are developing, maintaining and providing technical



MK-46 exercise torpedo being launched



Mark 54 Torpedo aboard USS Ross

Core Technical Competencies

- Pacific USW T&E Range & Test Facility Operations
- USW Weapons & Vehicles Range & Env Test Sys
- Torpedo & UUV Maintenance & Repair
- Undersea Warfare Sys Material Depot
- Torpedo & Unmanned Undersea Vehicles ISE & ILS
- Submarine USW Sys ISE & ILS
- Carrier USW Sys

solutions to meet Fleet material and operational readiness needs. As a part of NAVSEA's world class team of professionals, we are a responsive, effective, and efficient provider to the Navy.

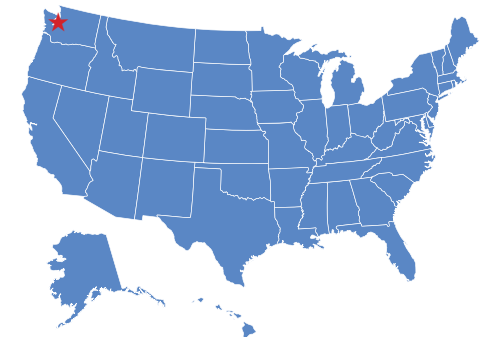
Major Locations

NUWC Keyport is located in Keyport, Washington, with additional detachments located in Hawthorne, Nevada, San Diego, California, Guam, and Hawaii.

Contact Information

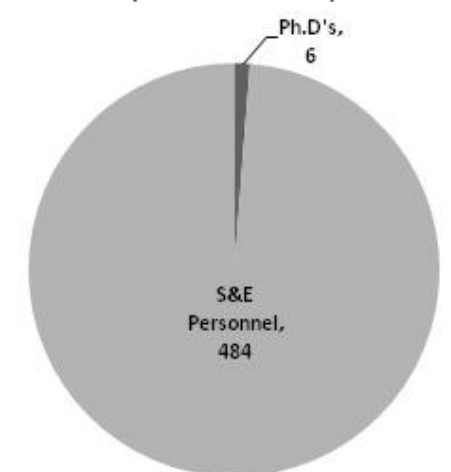
NUWC Division Keyport
 Public Affairs Office
 Phone: (360) 396-2699
 Email: kypt_PAO@navy.mil
 Website: www.navsea.navy.mil/nuwc/keyport

NUWC Sites

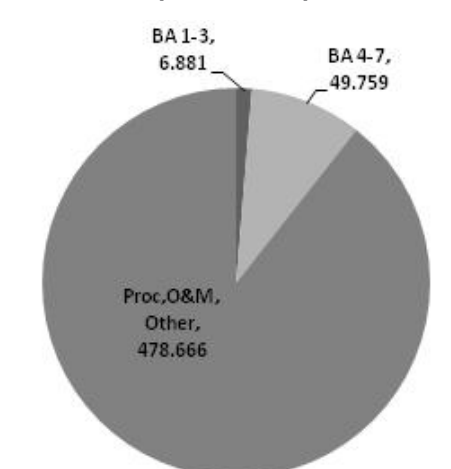


- ★ Keyport, Washington

Human Capital 2010 (total Number)



Budget FY09 (\$ Millions)





Space and Naval Warfare Systems Command (SPAWAR) - Systems Center Pacific San Diego, CA

Mission

Enable information dominance for our Naval, Joint and Coalition Warfighters through research, development, delivery and support of integrated capabilities.

Brief History of the Directorate

With more than seven decades of combined research, development, test and evaluation experience and proven expertise across a myriad of technologies integrating forces, platforms, systems and functions into full spectrum, coordinated operational capabilities, SSC Pacific draws from a long lineage of predecessors, including

- U.S. Navy Electronics Laboratory
- Naval Ordnance Test Station
- Naval Command Control and Communications Laboratory
- Naval Undersea Warfare Center
- U.S. Naval Electronics Laboratory
- Naval Undersea Research and Development Center
- Naval Undersea Center
- Naval Ocean Systems Center (NOSC) San Diego
- Naval Electronic Systems Engineering Center
- Naval Command, Control and Ocean Surveillance Center (NCCOSC) San Diego
- Naval Center for Tactical System Interoperability (NCTSI)

SSC Pacific is uniquely qualified to make the Navy's information dominance vision a reality

Engineering and Systems Development

Recent/Historical Technical Milestones

- Invented, developed, tested and fielded Internet Protocol based networks to afloat subsurface and air communities
- Integrated Iridium satellite SIPRNET chat in E2C aircraft supporting Operation Tomodachi search and rescue ops in Japan
- Developed tech solutions for remotely operated vehicles performing counter IED missions in theater
- Invented magnetometer detection of "suicide bombers" in theater
- Developed Link 16 over Wide Area Network (WAN) supporting BMD
- Fielded air traffic control system used by ground forces in theater
- Delivered next generation of anti-jam satellite communications
- Delivered expeditionary Marine Corps comms and C2 capabilities to Afghanistan
- Delivered enhanced network security and information assurance
- Developed and delivered advanced ISR capabilities
- Developed and delivered Advanced Information Fusion capabilities
- Developed anti-jam Global Positioning Satellite (GPS) System
- Developed and fielded advanced capabilities for improved situational awareness, shared information
- As DoD lead, developed and completed proof of concept for Internet Protocol version 6

C4ISR for Information Dominance



Iridium satellite SIPRNET chat aboard E-2C supporting Operation Tomodachi



UUV EOD RHIB image evaluation



Marine Corps comms and C2 capabilities in Afghanistan

SPAWAR - Systems Center Pacific San Diego, CA

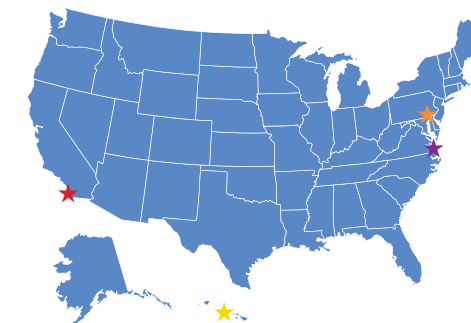


SSC Pacific Data Center linked to command center



Command Center at U.S. Pacific Command

SPAWAR Sites



- ★ San Diego, California
- ★ Pearl City, Hawaii
- ★ Philadelphia, Pennsylvania
- ★ Norfolk, Virginia

Core Technical Competencies

A DoD and Navy designated leader in research and development with more than 50 Technical Warrant Holders

Scientific research in the following areas:

- Decision Optimization and Human Factors
- Advanced Communications and Networks
- Autonomous Systems and Autonomy
- Predictive Analysis
- Micro Electro Mechanical Systems (MEMS)
- Environmental Science
- Energy
- Marine Mammals Research

Engineering and Systems development in the following areas:

- Command and Control
- Communications and Networks
- ISR including Ocean Surveillance, Information Operations
- Expeditionary C4I systems
- Information Assurance (IA) and Integrated Cyberspace Operations
- In-Service Fleet System Support (Installation, Sustainment, Training)
- System of Systems Engineering
- Modeling and Simulation
- C4ISR for Unmanned Systems
- Image Recognition, Data Fusion/Correlation
- C4ISR for Command Centers and Situation Rooms
- Navigation Systems
- Antenna and Topside Design
- High Performance Computing
- Enterprise Information Systems

- Delivered Rapid Information Transmission (RIT) of time critical information from sensors to operational units during Operation Tomodachi
- Delivered advanced, automated analytics in Afghanistan

Unique Facilities

- Cyberwarfare Lab
- End-To-End C4ISR Test and Certification Lab
- C4ISR training ranges for unmanned systems
- Model range for testing ship antenna design
- Anechoic test pool replicating open ocean environment
- High Performance Computing Center
- C4ISR Depot and Crypto Repair Facility
- Navy Data Center

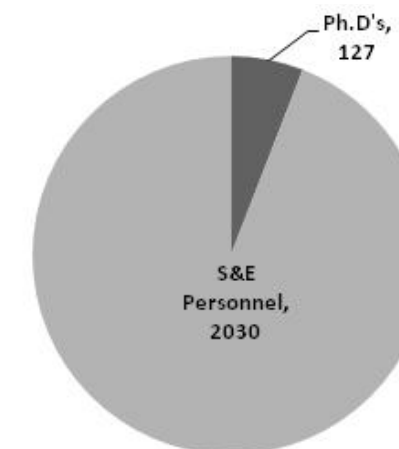
Major Locations

SPAWAR Systems Center Pacific is located in San Diego, California with additional detachments located in Hawaii, Guam, Japan, Philadelphia and Norfolk.

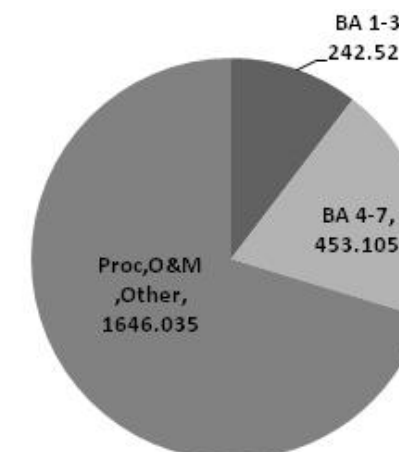
Contact Information

Space and Naval Warfare Systems Center Pacific
53560 Hull Street,
San Diego, CA 92152-5001

Human Capital 2010 (total Number)



Budget FY09 (\$ Millions)





SPAWAR - Systems Center Atlantic Charleston, SC

Mission

Rapidly deliver and support solutions that enable information dominance for our Naval, Joint, National and Coalition Warfighters.

Vision

Make IT count for the Warfighter and the Nation

Brief History of the Directorate

SPAWAR Systems Center Atlantic can trace its origins back to January 9, 1994, when a Naval Command was commissioned in Charleston, S.C., establishing the Naval Command, Control and Ocean Surveillance Center, In-Service Engineering, East Coast

Core Technical Competencies

Scientific Research in areas related to:

- Enterprise Information Technology
- Cyber Security and Analysis
- Advanced Communications Networks and Waveforms
- Autonomous Systems
- Human Factors
- Predictive Analytics
- Assisted Decision Making

Engineering and Systems Development in areas relating to:

- Net Centric Enterprise Engineering and Integration
- Rapid C4ISR Technology Prototyping and Fielding
- Command and Control, Business and Enterprise Information Systems
- Expeditionary C4ISR Engineering and Integration
- Communications and Networks
- Intelligence, Surveillance, Reconnaissance and Information Operations
- Space Systems
- Information Assurance and Cyber Security
- System Test, Evaluation and Certification
- Software Development
- Command Center/Facilities C4ISR

Division (NISE East). The consolidation was the result of the 1993 Base Closure and Realignment Commission's decision. This new command brought together the expertise of approximately 1,000 federal workers from four former naval activities along the East Coast:

- Naval Electronic Systems Engineering Center in Charleston, S.C.
- Naval Electronic Systems Engineering Center in Portsmouth, Va.
- Naval Electronic Systems Engineering Activity in St. Inigoes, Md. and
- Naval Electronic Systems Security Engineering Center in Washington, D.C.

On Sept. 30, 1997 a BRAC decision merged the Naval Command, Control and Ocean Surveillance Center into its parent command, the Space and Naval Warfare Systems Command. As a result, the field activities were renamed and NISE East became SSC Charleston.



Integrated Product Center Command Lab



Common Submarine Radio Room (CSRR)



Chairman of the Joint Chiefs of Staff Navy Adm. Mike Mullen recognized Space and Naval Warfare Systems Center Atlantic employees during a ceremony at Joint Base Charleston for their highly successful efforts integrating electronic systems into MRAP/MATV vehicles. SSC Atlantic has integrated more than 16,000 Mine Resistant Ambush Protected (MRAP) and 8,000 MRAP ALL Terrain (M-ATVs) to date.



SPAWAR - Systems Center Atlantic Charleston, SC

The Space and Naval Warfare Systems Center Atlantic (SSC Atlantic) was commissioned Sept. 29, 2008 during ceremonies in Charleston, S.C., Norfolk, Va., and New Orleans, La. Under the command of Captain Bruce Urbon, SSC Atlantic includes the former SSC Charleston, SSC Norfolk and SSC New Orleans, along with several sites in the continental U.S. and strategic satellite offices in Europe, the Middle East and Antarctica. SSC Atlantic also incorporates approximately 48 civilian former employees of SSC San Diego who work in the Tidewater, Va., area to support the Atlantic fleet. SSC Atlantic has more than 3,500 government employees, 120 military personnel and a significant number of industry partners.

Space and Naval Warfare Systems Center Atlantic reports directly to the Space and Naval Warfare Systems Command located in San Diego, Calif. We utilize our major stateside offices in South Carolina, Virginia, Louisiana, Florida and Washington, D.C., as well as overseas posts in Europe, the Mideast and Antarctica, to effectively meet the needs of our customers.

Recent/Historical Organizational and Technical Milestones

- Capability Maturity Model Integration level III assessment
- Developed and/or deployed Battlefield Command & Control Centers (BC3), across the CENTCOM theaters
- Developed and fielded over 21 COCOM and service specific Command Centers for the Command and Control of operational forces
- Fielded and supported USMC Combat Operations Centers across Iraq & Afghanistan
- Common Geospatial Navigation Toolkit (COGENT) supports safe navigation by providing a soft real-time graphical display of ownship position and surrounding area
- Security Content Automation Protocol (SCAP) Compliance Checker
- Delivered Chapter 33 Post 9/11 GI Bill Long-Term Solution assisting over 400,000 veterans and Warfighters
- Electronic systems vehicle integration of more than 30,000 tactical vehicles, including 16,000 Mine Resistant Ambush Protected (MRAP) vehicles and 8,000 Mine Resistant All Terrain Vehicles (M-ATVs)
- Design, procurement, installation and sustainment of more than 900 internet cafes in Iraq and Aghanistan, providing a better quality of life for our deployed service members by offering communications capability to family members
- Supported nine regional cyber challenge events leading up to the National Collegiate Cyber Defense Competition
- Accredited DoD Tier 2 Computer Network Defense Service Provider (CNDSP) by USSTRATCOM to provide CND services: Protect, Monitor, Analyze and Detect Respond. Reporting and tasking comes directly from Tier 1(USCYBERCOM)

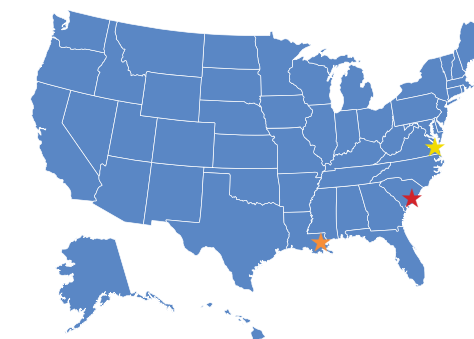
Major Locations

SPAWAR Systems Center Atlantic is located in Charleston, South Carolina, with additional sites located in Tidewater, Virginia; New Orleans, Louisiana; Washington, D.C.; and Tampa, Florida. SPAWAR Systems Center Atlantic also has overseas posts in Europe, the Mideast and Antarctica.

Contact Information

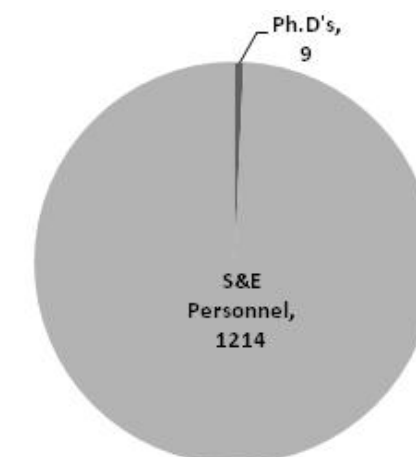
Space and Naval Warfare Systems Center Atlantic, PO Box 190022
North Charleston, SC 29419-9022 / Public Affairs Office: 843.218.5572

SPAWAR Sites

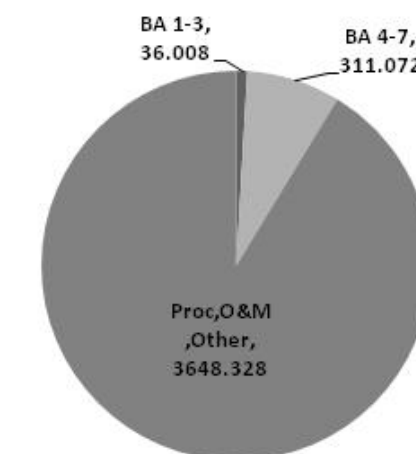


- ★ Charleston, South Carolina
- ★ Tidewater, Virginia
- ★ New Orleans, Louisiana

Human Capital 2010 (total Number)



Budget FY09 (\$ Millions)





AIR FORCE LABORATORIES



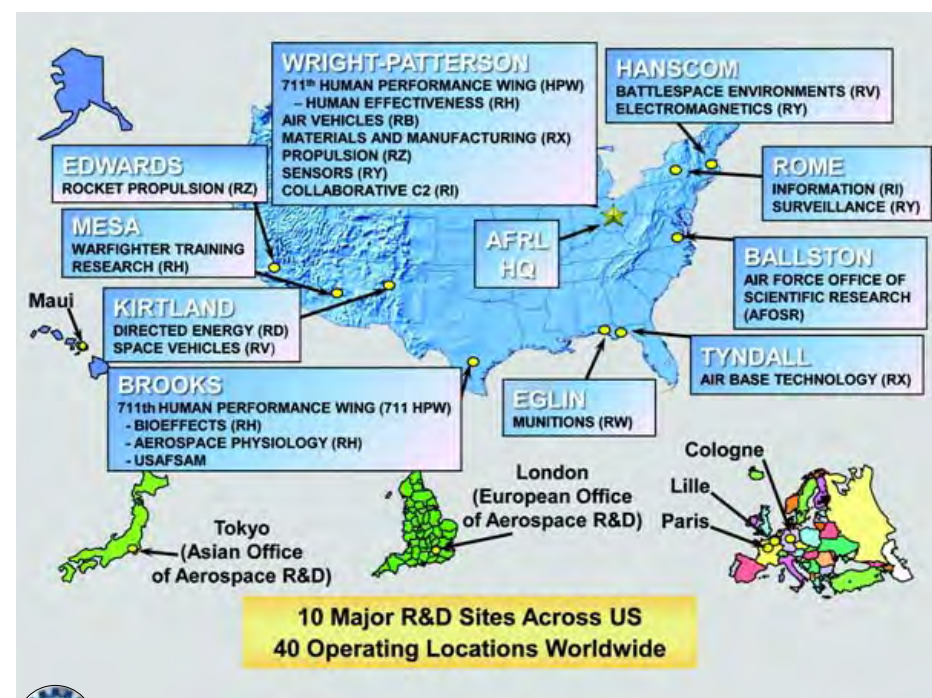
Headquarters Air Force Research Laboratory (HQ-AFRL) Arlington, VA

Mission

The Air Force Research Laboratory (AFRL) is the science and technology (S&T) arm of the AF acquisition and sustainment community, leading, discovering, developing, and delivering technology innovation that turns the Air Force S&T Vision into reality.

AFRL, leading a diverse team of technology partners, plays a vital role in providing warfighters with unequalled capabilities to fly, fight, and win in air, space, and cyberspace. The lab delivers technology directly to operational units combating terrorism; transitions technology to the acquisition and sustainment community, increasing the capability and affordability of existing and next-generation systems; and lays the technology foundation for the future Air Force. AFRL's technology areas include Basic Research, Air Vehicles, Directed Energy, Human Effectiveness, Information, Materials and Manufacturing, Munitions, Propulsion and Energy, Sensors, and Space Vehicles. In 2008, the AFRL mission grew with the addition of the 711th Human Performance Wing (711 HPW) at Wright-Patterson Air Force Base, Ohio. The 711 HPW is the first human-centric warfare Wing that invests in human-centered S&T, aerospace medicine, and human systems integration.

The laboratory and its predecessors have overseen more than 80 years of critical research efforts for the Air Force and DOD. Its technology breakthroughs can be found in all of today's modern aircraft and weapons systems, including the F-117 stealth fighter, B-2 bomber, C-17 airlifter and the F-22 fighter. It was contributed to significant advancements in modern communications, electronics, manufacturing, and medical research and products.



With a total budget approaching \$3.7B (\$2B in congressional appropriation and roughly \$1.7B in customer funding), AFRL conducts all the basic research, applied research, advanced technology development, and manufacturing technology development for the AF.

Organization

AFRL accomplishes its mission through 10 organizational units located at 10 major research and development sites across the U.S. and 40 operating locations worldwide. The geographic and technical diversity of AFRL's research facilities helps it bring the best technologies from around the world into the Air Force and Department of Defense.



Air Force Office of Scientific Research - With a worldwide exchange program for scientists and engineers, AFOSR is the basic research manager for AFRL at its headquarters in Arlington, VA. AFOSR invests in long-term, broad-based research into aerospace-related science and engineering. Nearly 80 percent of the research is conducted in academia and industry and the remaining 20 percent is conducted within AFRL. AFOSR's investment in basic research programs is distributed to about 300 academic institutions, 145 contracts with industry and more than 150 internal AFRL research efforts.



Air Vehicles Directorate - With headquarters at Wright-Patterson AFB, OH, the Air Vehicles Directorate leads the effort to develop and transition superior technology solutions that enable dominant military aerospace vehicles. To achieve this, core technology areas focus on aeronautical sciences, control sciences, structures and integration.



Directed Energy Directorate - With headquarters at Kirtland AFB, NM, the Directed Energy Directorate develops, integrates and transitions science and technology for directed energy, to include high power microwaves, lasers, adaptive optics, imaging and effects to assure the preeminence of the United States in air and space. It is the Air Force's center of excellence for high power microwave technology and the DoD's center of expertise for laser development, including semiconductor, gas, chemical and solid-state lasers.



711th Human Performance Wing - The 711th HPW at Wright-Patterson AFB, OH, concentrates on aerospace medicine, science and technology, and human systems integration. It merges the AF Research

Headquarters Air Force Research Laboratory (HQ-AFRL) Arlington, VA



Laboratory Human Effectiveness Directorate with the mission organizations of the 311th Human Systems Wing currently located at Brooks City-Base, Texas; the Performance Enhancement Directorate and the US AF School of Aerospace Medicine.



Information Directorate - With headquarters at Rome, NY, the Information Directorate develops information technologies for aerospace command and control, and its transition to air, space and ground systems. Its focus areas include a broad spectrum of technologies including information fusion and exploitation, communications and networking, collaborative environments, modeling and simulation, defensive information warfare and intelligent information systems technologies.



Materials and Manufacturing Directorate - With headquarters at Wright-Patterson AFB, OH, and an additional research facility at Tyndall AFB, FL, the Materials and Manufacturing Directorate develops new materials, processes and manufacturing technologies for use in aerospace applications. This includes aircraft, spacecraft, missiles, rockets and ground-based systems and their structural, electronic and optical components.



Munitions Directorate - With headquarters at Eglin AFB, FL, the Munitions Directorate develops, demonstrates and transitions science and technology for air-launched munitions for defeating ground fixed, mobile/relocatable, air and space targets to assure pre-eminence of U.S. air and space forces. It is dedicated to providing the AF with a strong revolutionary and evolutionary technology base upon which future air-delivered munitions can be developed to neutralize potential threats to the US.



Propulsion Directorate - With headquarters at Wright-Patterson AFB, OH, and an additional research facility at Edwards AFB, CA, the Propulsion Directorate develops air and space vehicle propulsion and power technologies. Focus areas include turbine and rocket engines, advanced propulsion systems, and the associated fuels and propellants for all propulsion systems.



Sensors Directorate - With headquarters at Wright-Patterson AFB, OH, and additional research facilities at Hanscom AFB, MA and Rome, NY, the Sensors Directorate develops the new technologies that US warfighters need to find and precisely engage the enemy and eliminate its ability to hide or threaten our forces. In collaboration with other AFRL directorates and DoD organizations, the directorate develops sensors for air and space reconnaissance, surveillance, precision engagement and electronic warfare systems.

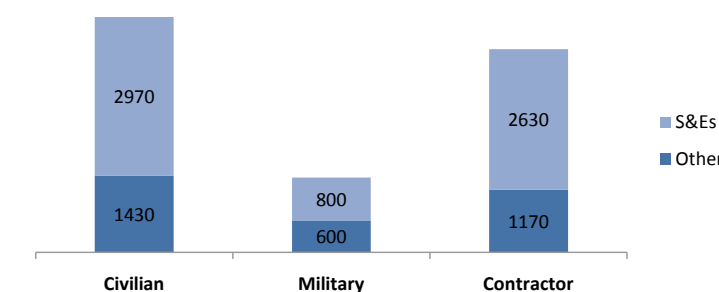


Space Vehicles Directorate - With headquarters at Kirtland AFB, NM and an additional research facility at Hanscom AFB, MA, the Space Vehicles Directorate develops and transitions space technologies for more

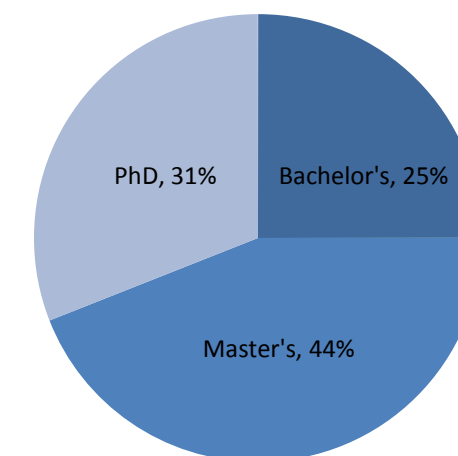
effective, more affordable warfighter missions. The directorate also leverages commercial, civil and other government resources that ensure America's defense advantage

AFRL Human Capital

AFRL Workforce (total number)



Civilian S&E Education Level, 2010



Contact Information

For more information, please contact:

88th Air Base Wing Public Affairs,
5215 Thurlow Street, Bldg 70,
Wright-Patterson Air Force Base, Ohio 45433-5543
DSN 672-3252 or 937-522-3252.

Alternatively, visit the HQ AFRL website at:
<http://www.wpafb.af.mil/AFRL/>





AFRL – Air Force Office of Scientific Research (AFOSR) Arlington, VA

Mission

To manage the basic research investment for the USAF to discover, shape and champion the science that profoundly impacts the future Air Force. As part of the AFRL, AFOSR's technical experts identify and fund long-range technology options within AFRL, university and industry laboratories and ensure the timely transition of research results that offer significant benefit to national warfighting and peacekeeping capabilities. AFOSR continues to expand the horizon of scientific knowledge through its leadership and management of the research program to support AF goals of control and maximum utilization of air, space, and cyberspace.

Brief History of the Directorate

With the establishment of an independent AF after World War II, the importance of scientific research was given emphasis when the Office of Air Research was established in February 1948 as part of the Air Materiel Command at Wright Field, Ohio. Several key studies completed in 1949, especially the Ridenour Report, were instrumental in gaining additional high-level support for an expanded Air Force R&D effort, as well as the establishment of the Air Research and Development Command in January 1950. As part of this effort, the Air Force Office of Scientific Research (AFOSR) was created in October 1951 to manage basic research for the AF. It was based in the Washington D.C. area to facilitate relationships with sister service and various governmental research agencies.

The establishment of AFOSR was of great consequence because it represented the acknowledgement that not only were science, technology and the AF intimately associated, but also that the strength of the nation's research community could add immeasurable value to the service's capabilities. Today, as an integral part of the AFRL, the sixty-year mission of AFOSR has remained the same: to seek out and apply the powerful attributes of revolutionary basic science to meet the future requirements of the Air Force.

Recent/Historical Technical Milestones

- Laser Research: This research ultimately resulted in its application to Precision Guided Munitions, secure communications, enhanced surgical procedures, and missile defense.
- Scientific Investments: With an emphasis in applied mathematics control theory and decoding algorithms for modern flight control systems.
- Chemical Oxygen-Iodine Laser (COIL): Currently used on the Airborne Laser Testbed.
- Joint Precision Air Drop System (JPADS): A GPS-assisted system that guides air-dropped cargo to precise ground delivery out of ground threats.
- Supersonic Test Release of the MK-82 Joint Direct Attack Munition: This was the first successful test release of any air delivered munition at this speed, paving the way for JDAM supersonic weapon release capability.



An AFOSR - funded program was crucial to the recent successful supersonic test release of a MK-82 Joint Direct Attack Munition



A 1999 joint AFOSR/Army Research Laboratory program resulted in the highly successful Joint Precision Air Drop System (JPADS)

Core Technical Competencies

Aerospace, Chemicals & Materials Sciences

- Aero-Structure Interactions and Control
- Energy, Power and Propulsion
- Complex Materials and Structures

Physics & Electronics

- Plasma Physics and High Energy Density
- Optics, Electromagnetics, Communications

Math, Information & Life Sciences

- Natural Materials and Systems
- International and Outreach Programs
- Information and Complex Networks
- Decision-Making
- Dynamical Systems, Optimization, and Control



AFRL – Air Force Office of Scientific Research (AFOSR) Arlington, VA

Major Locations

AFOSR's main office is located in Arlington, Virginia. AFOSR's international detachments are located in London, U.K., Tokyo, Japan, and Santiago, Chile. These offices provide direct interchange with members of the scientific and engineering community and encourage the establishment of beneficial relationships between AF scientists and engineers and their foreign counterparts within their respective geographical and technical areas of responsibility.

Asian/European/Southern Office of Aerospace Research & Development's (AOARD/EOARD/SOARD's)

AOARD/EOARD/SOARD's primary focus is to discover and facilitate the discovery of world-class fundamental research relevant to Air Force needs. AOARD's geographical area of responsibility includes Asia and Pacific Rim countries including India and Australia; EOARD's is Europe, the mid-East, Africa, and countries in the former Soviet Union; and SOARD's is South America, Mexico and Central America. Canada is handled directly from the AFOSR/IO office.

To facilitate the discovery and acquisition of this research, they operate three main programs: Window on Science (WOS), which brings foreign researchers to meet with AFRL scientists and engineers to share their research; Conference Support, to promote the interchange of science between the Air Force and the world; and Research Grants and Contacts, to directly support foreign research of Air Force interest.

EOARD (London) and AOARD (Tokyo) are collocated with similar Army and Navy international offices. The new office (SOARD) is proposed to be located in the American Consulate in São Paulo, Brazil, and will work closely with similar Army and Navy liaison offices in Buenos Aires, Argentina, and Santiago, Chile.

Contact Information

Air Force Office of Scientific Research

875 N. Randolph St., Suite 325, Room 3112
Arlington, Virginia 22203 USA
Tel: +1-703-696-7797
Fax: +1-703-696-6230
E-mail: publicaffairs@afosr.af.mil

Asian Office of Aerospace Research and Development (AOARD)

U.S. Address: Unit 45002, APO AP 96338-5002
Japanese Address: 7-23-71 Roppongi Minato-ku, Tokyo Japan 106-0032

Tel: +81-3-5410-4409
DSN: +315-229-4409
Fax: +81-3-5410-4407
E-mail: aoard@aoard.af.mil

European Office of Aerospace Research and Development (EOARD)F

U.S. Address: Unit 4515, Box 14, APO AE 09421
European Address: 86 Blenheim Crescent, Ruislip, Middlesex, HA4 7HB, United Kingdom

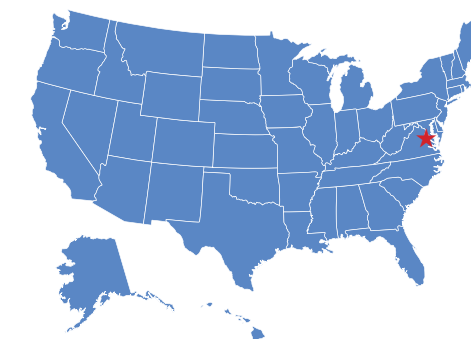
Tel: +44-1895-61-6467
DSN: +314-235-6467
Fax: +44-1895-61-6012
E-mail: eoard@eoard.af.mil

Southern Office of Aerospace Research and Development (SOARD)

U.S. Address: Unit 3460, DPO, AA 34033
S. American Address: ATTN: AFOSR/SOARD, Av Andres Bello 2800, Las Condes, Santiago, Chile

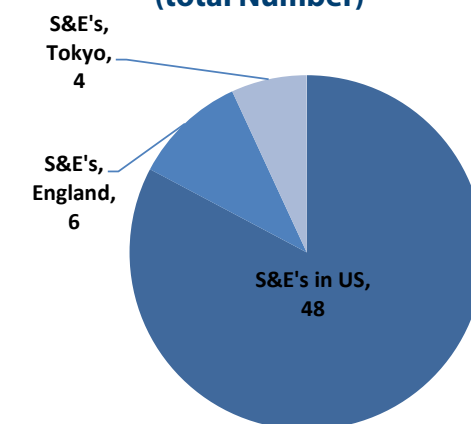
Tel: +011 56 2 330-3237
E-mail: theamericas@afosr.af.mil

AFOSR Sites

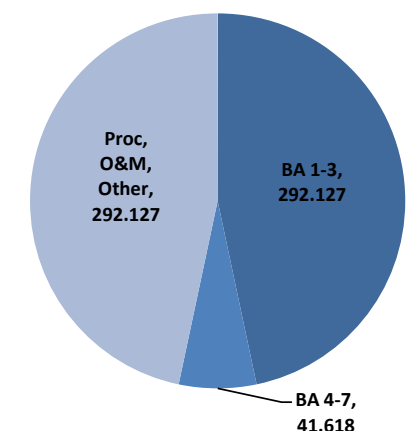


★ Arlington, Virginia

Human Capital 2010 (total Number)



Budget FY09 (\$ Millions)





AFRL – Air Vehicles (RB)

Wright Patterson AFB, OH

Mission

To develop and transition superior air vehicle technology solutions that enable dominant military aerospace vehicles. The Air Vehicles Directorate is the preeminent aeronautical vehicle research and development organization in the world. The core disciplines are aeronautical science, vehicle control technologies and structures for all atmospheric and transatmospheric vehicles. The technologies in these core disciplines are developed from inception through transition to both current and future military aerospace vehicles.

Brief History of the Directorate

The Laboratory was formed at Wright-Patterson Air Force Base, Ohio on October 31, 1997 as a consolidation of four Air Force laboratory facilities (Wright, Phillips, Rome, and Armstrong) and the Air Force Office of Scientific Research under a unified command. The Laboratory is composed of 8 technical directorates, 1 wing, and the Office of Scientific Research. Each technical directorate emphasizes a particular area of research within the AFRL mission which it specializes in performing experiments in conjunction with universities and contractors.

The AFRL Air Vehicles Directorate seeks to enable the joint warfighter to anticipate, find, fix, track, target, engage, and assess anyone, anywhere, at any time. The directorate focuses on core competencies (integration, control sciences, structures and aeronautical sciences) and works in concert with other AFRL directorates to achieve this vision. The Directorate has established Centers of Excellence in computational sciences, control science, multidisciplinary technologies, and structural science.

Recent/Historical Technical Milestones

- Automated Aerial Refueling (AAR) Precision ReINav Open Loop Flight Test (PROFT): To perform boom and receptacle refueling of RPA systems with the existing AF tanker fleet.
- Automatic Collision Avoidance Technology/Fighter Risk Reduction Program (ACAT/FRRP): To virtually eliminate air vehicle mishaps caused by controlled flight into terrain.
- Intelligent Control & Evaluation of Teams (ICE-T) program: Using coordinated Unmanned Air Vehicles (UAVs) in conjunction with Unmanned Ground Vehicles (UGVs), it broadens the utility of unmanned vehicles in area and perimeter security operations.
- Micro Air Vehicle Integration and Application Research Institute (μAVIARI) Indoor Flight Test Laboratory: A new \$1.5 million facility dedicated to the advancement of Micro Air Vehicle (MAV) technologies.



Trisonic Gas-Dynamics Facility (TGF)



Vertical Wind Tunnel (VWT)

Core Technical Competencies

- Aeroelasticity Analysis Methods
- Adaptive, Flow, and Photonic Flight Control
- Control Systems and Theory
- Experimental Aeronautical Sciences
- Experimental, Multifunctional, Composite, Metallic, Thermal, and Adaptive Structures' Development and Health Assessment
- Flow Control/Flow Physics, Plasma Physics
- Low-Speed/High-Speed Aerodynamic Configurations
- Multidisciplinary, Applied Science, and High-Speed Computational Research
- Simulation-Based Research and Development
- Software Verification and Validation
- Structural Integration – Propulsion and Weapons
- Structural Integrity and Dynamics
- Thermal Management Systems
- Unmanned Air Vehicle Cooperative Control
- Space Access and Hypersonics Guidance and Control



AFRL – Air Vehicles (RB)

Wright Patterson AFB, OH

Major Locations

Facility for Innovative Research in Structures Technology (FIRST), Wright Patterson AFB, OH

FIRST enables basic and early applied research at the coupon and small subcomponent levels. The facility comprises four reconfigurable laboratories with a shared infrastructure that allows for lab interchangeability. A fifth laboratory includes thermal and mechanical load frames as well as a scanning electron microscope. FIRST research activities support technical areas such as multifunctional structures, structural health monitoring and management, thermal energy support, adaptive structural concepts, and extreme environment instrumentation in support of future capabilities for warfighters.

Aerospace Vehicles Technology Assessment & Simulation (AVTAS) Laboratory, Wright Patterson AFB, OH

AVTAS is utilized for the development and application of engineering flight modeling, simulation, and analysis tools to support air vehicle and weapon system technology integration, assessment, demonstration, and transition under realistic mission conditions. Using a variety of modern hardware and software simulation tools and techniques, AFRL scientists and engineers assess mission and combat effectiveness, survivability, flying qualities, flight safety, and workload impact of future air vehicle technologies. The facility includes a diverse set of cockpit/control station simulation environments that support both constructive and real-time operator-in-the-loop simulations of air-to-air, air-to-ground, and trans-atmospheric simulation environments.

Trisonic Gas-Dynamics Facility (TGF), Wright Patterson AFB, OH

TGF is a 2-foot square, continuous-flow, closed-circuit wind tunnel that is optimal for conducting research experiments. The facility provides a cost-effective rapid test capability for AFRL to explore propulsive and weapons integration studies and aerodynamic performance on a multitude of air vehicles from subsonic to supersonic speeds at various simulated altitudes.

Micro Air Vehicle Integration and Application Research Institute (μAVIARI), Wright Patterson AFB, OH

μAVIARI is dedicated to the research and development of Micro Air Vehicles (MAVs). Because one of the primary missions driving MAV research is the need to fill the covert, close-in sensing requirement, MAVs must be able to covertly find, track, and target adversaries while operating in complex urban environments. The μAVIARI allows scientists and engineers to research, design, fabricate, and test working MAVs.

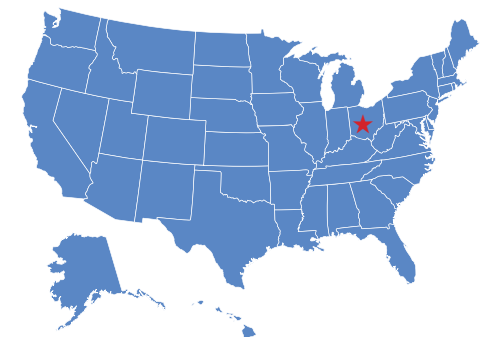
Control Systems Integration Facility (CSIF), Wright Patterson AFB, OH

CSIF provides a hardware and software environment where component and subsystem design modeling, simulation, analysis, and prototype fabrication tools are combined with real-time hardware-in-the-loop (HITL) capabilities to integrate, assess, and transition flight-critical control systems research and development efforts. The CSIF features proven flight hardware, valued at over \$13M, for HITL experimentation.

Contact Information

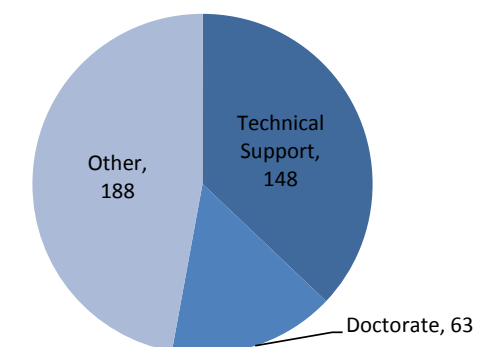
For additional information, visit the AFRL's Directed Energy website at <http://www.wpafb.af.mil/afri/rb/> or contact the Public Affairs office at 937-522-3252 or by email 88abw.pa@wpafb.af.mil

RB Sites

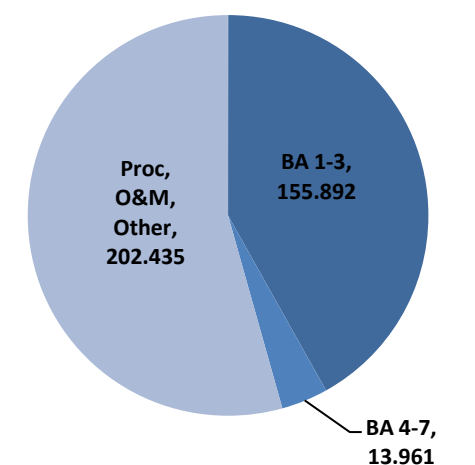


★ Wright Patterson AFB, Ohio

Human Capital 2009 (total Number)



Budget FY09 (\$ Millions)





AFRL – Directed Energy (RD)

Kirtland AFB, NM

Mission

To improve warfighter capabilities such as long-range strike, counter electronics, force protection, and space control. The Directorate assesses the potential applications and effects of systems using directed energy technologies, managing the data collection and reporting needed for space situational awareness. The monitoring activities allow seamless situational awareness of space activities and ensure freedom of action in space. The ground-based and airborne laser weapon and communications systems protect air and ground forces and assets, providing real-time support anywhere in the world.

Brief History of the Directorate

The Directed Energy Directorate traces its roots to the vision of airpower pioneers who understood science as key to air supremacy. The Directorate's heritage began in February 1962 when the Department of Defense's Advanced Research Projects Agency (ARPA) issued an order that funded seed money for the Air Force Special Weapons Center (AFSWC), the predecessor of the Air Force Weapons Laboratory (AFWL), to begin work investigating the potential of lasers for future weapon systems. The AF Weapons Laboratory was established at Kirtland AFB, New Mexico, in May 1963 from research and development elements of AFSWC.

AFWL's initial focus was on nuclear weapons effects and the vulnerability/survivability of US and foreign weapon systems. In 1982, the Air Force Space Technology Center was established at Kirtland, and the Air Force Weapons Laboratory, Air Force Geophysics Laboratory and Air Force Rocket Propulsion Laboratory were assigned to the new center. That arrangement allowed a greater concentration on space research and emphasis on directed-energy technologies to be applied to space.

In December 1990, Phillips Laboratory was established as one of four Air Force super laboratories. The Phillips Laboratory was formed from the Air Force Space Technology Center and the Weapons Laboratory, both at Kirtland; the Astronautics Laboratory at Edwards AFB, California (formerly the Air Force Rocket Propulsion Laboratory); and the Geophysics Laboratory at Hanscom AFB, Massachusetts. On April 8, 1997, the Air Force Research Laboratory was established and the super laboratories were reorganized and consolidated into a single AFRL organization with its headquarters at Wright-Patterson AFB. The Directed Energy Directorate was established as an AFRL technical directorate on Kirtland AFB.

Recent/Historical Technical Milestones

- First Active Solar System at Kirtland AFB.
- Flowing Diode-Pumped Alkali Laser (DPAL): A gas laser that leverages the advantages of solid-state pump sources and gaseous gain media.
- Locking of Optical Coherence by Single-detector Frequency Tagging (LOCSET): It allows precise engagement with military targets, while minimizing collateral damage.
- Microwave Attack of Explosives using a Powerful Energy Radiator (MAXPOWER): To mitigate warfighter exposure to blast and shrapnel.
- Standoff Intelligence Detection (SID)/Surrogate Predator: It allows to simulate Remotely Piloted Aircraft.



Shiva Star - AFRL's High-Power Systems Facility on Kirtland AFB, New Mexico.



Standoff Intelligence Detection - AFRL's procurement of Surrogate Predator aircraft.

Core Technical Competencies

High Power Microwaves

- Pulsed Power
- Low Frequency Radio Frequency
- High Frequency Radio Frequency
- Plasma

Lasers

- Gas Lasers
- Solid State Lasers
- Fiber Lasers
- Laser System Integration

Beam Control

- Atmospheric Propagation and Compensation
- Adaptive Optics
- Acquisition, Tracking and Pointing
- Space Situational Awareness

Effects, Modeling and Simulation

- Systems
- Mission
- Directed Energy Effects



AFRL – Directed Energy (RD)

Kirtland AFB, NM

Major Locations

Directed Energy Directorate, Kirtland AFB, New Mexico

The AFRL's Directed Energy Directorate is the USAF's center of expertise in the range of technologies required for high-energy lasers, high-power microwaves and millimeter waves and advanced optics. Associated technologies include optical imaging and communication technologies and modeling, simulation and effects studies. As the technical expert, the Directorate also provides independent assessment and analysis of directed energy concepts for multiple AF customers.

Maui Space Surveillance System (MSSS), Maui, Hawaii

AFRL's MSSS is a state-of-the-art site combining operational satellite tracking facilities with a research and development facility, the only one of its kind in the world. The MSSS houses the largest telescope in the DoD, the 3.6-meter Advanced Electro-Optical System (AEOS). The MSSS supports the AF Space Surveillance Network as a contributing sensor for space object identification and orbital cataloging.

Shiva Star, Kirtland AFB, New Mexico

AFRL's High-Power Systems Facility is located on Kirtland Air Force Base, NM, for research into military applications of high-energy, pulsed-power systems. The facility houses the Shiva Star fast capacitor bank, the AF's largest pulsed-power system. Shiva Star is used to explore advanced concepts in high-energy density magnetized plasmas to include novel approaches to generating X-ray and neutron pulses. Shiva Star is a unique national asset that allows the simulation of large explosive, pulsed-power generator systems and nuclear weapons effects.

Starfire Optical Range (SOR), Kirtland AFB, New Mexico

AFRL's SOR is a world-class optical research facility whose mission is to develop optical wavefront control technologies to support missions in laser propagation, imaging, and advanced tracking. Equipment includes a 3.5-meter telescope (the second largest in the DoD), a 1.5-meter telescope, a 1-meter beam director, and smaller atmospheric measurement telescopes. The SOR is a vital resource in achieving the AF mission to operate freely in space.

White Sands Missile Range Laser and Optics Laboratories (North Oscura Peak (NOP) and Salinas Peak), New Mexico

These laboratories are designed to evaluate advanced sensor, tracking, and atmospheric compensation systems in support of high-energy laser applications. The site's goal is to improve the tracking of threats and the ability to efficiently transmit laser energy through the atmosphere to destroy targets. A 1-meter telescope is used for below-the-horizon pointing and, capable of revolving 360°, it is an invaluable asset when simulating realistic wartime conditions.

Contact Information

For additional information, visit the AFRL's Directed Energy website at http://www.kirtland.af.mil/afrl_de/ or contact Michael Kleiman, 377 ABW/PA at the Public Affairs office:

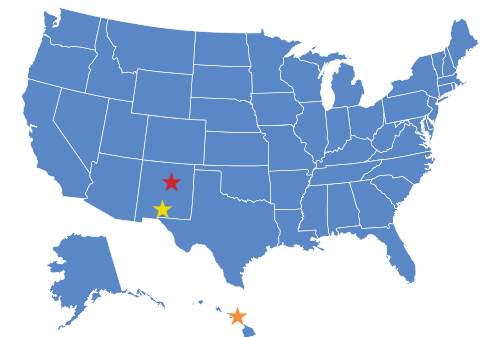
Address: 2000 Wyoming Blvd SE, Suite A-1
Kirtland AFB, NM 87117

Email: 377ABW.PA@kirtland.af.mil

Phone: 505-853-4704

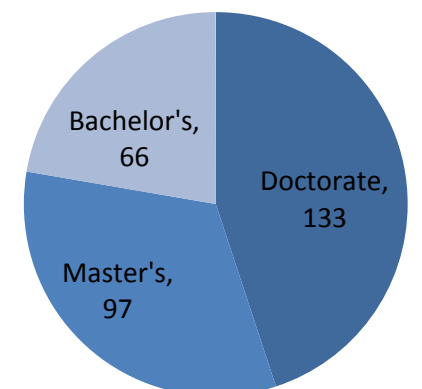
DSN: 246-4704

RD Sites

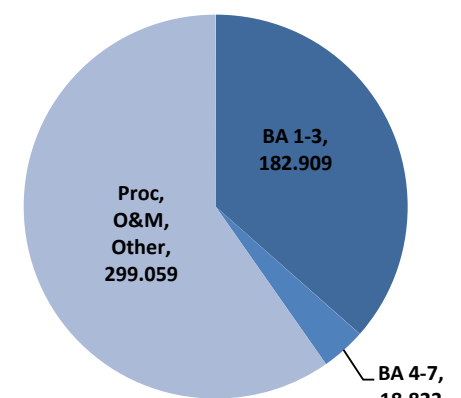


- ★ Kirtland AFB, New Mexico
- ★ North Oscura Peak and Salinas Peak, White Sands, New Mexico
- ★ Optical and Supercomputing Site, Maui, Hawaii

Human Capital



Budget FY09 (\$ Millions)





AFRL – Human Performance Wing (RH)

Wright-Patterson AFB, OH

Mission

To advance human performance in air, space, and cyberspace through research, education, and consultation. The Wing supports the AF operational military forces. The primary focus areas are aerospace medicine, human effectiveness science and technology, and human systems integration. In conjunction with the Navy Aerospace Medical Research Laboratory and surrounding universities and medical institutions, the 711 HPW functions as a joint Department of Defense (DoD) Center of Excellence for human performance sustainment and readiness, optimization, and enhancement.

Brief History of the Directorate

Headquartered at Wright-Patterson Air Force Base (WPAFB), Ohio, the 711 HPW is the first human-centric warfare Wing to consolidate research, education, and consultation under a single organization. The Wing comprises three mission units: the Human Effectiveness Directorate (RH), the United States Air Force School of Aerospace Medicine (USAFSAM), and the Human Performance Integration Directorate (HP).

In response to 2005 Base Realignment and Closure (BRAC) directives, the AF activated the 711 HPW in March 2008, establishing a unique organization focused entirely on the human operator as a critical element in military capabilities. The Wing merged the AFRL Human Effectiveness Directorate with functions of the 311th Human Systems Wing, the USAFSAM (including functions of the former Air Force Institute for Operational Health), and the 311th Performance Enhancement Directorate (renamed as the Human Performance Integration Directorate). The integrated staff supporting the Wing's three mission units consists of Plans and Programs, Financial Management, Contracting, Legal, and Operations Management experts, as well as a Human-Use Research Independent Review Board. In addition to supporting daily operations and integrating mission activities, this staff conceived - and continues to execute—relocation, financial, and personnel plans, along with other tasks necessary for meeting BRAC objectives. The 711 HPW coordinated BRAC construction with Army Corps of Engineers and 88th Air Base Wing civil engineers for 700,000 ft² of new facilities at WPAFB. The Wing is also working with the Corps of Engineers and joint partners to construct the 180,000 ft² Tri-Service Research Laboratory (Fort Sam Houston, Texas), which will house the Directed Energy Bioeffects Program.

Recent/Historical Technical Milestones

- Battlefield Air Targeting Man-Aided kNowledge (BATMAN): One of four Advanced Technology Development programs focused on improving AF Special Tactics Operators.
- Improved Flash-Bang Grenade (IFBG): A safer and more effective flash-bang grenade.
- Joint Terminal Attack Controller (JTAC) Virtual Training Dome: It provides real-time visual and electronic interaction in a synthetic hostile environment.
- Remotely Operated Vehicle Adaptable Tracking/Training System (ROVATTS™).
- Subject-Matter Analysis and Research Toolkit (SMART): To exploit structured and unstructured information and data.



Joint Terminal Attack Controller (JTAC) Virtual Training Dome



Universal Mobile Aircrew Restraint System (UMARS)

Core Technical Competencies

Forecasting (Predicting/Influencing Adversary Behavior)

- Biological Signatures
- Behavior Signatures
- Prediction and Anticipation
- Influence Operations

Decision Making (Advanced Cognitive Interface Technologies)

- Battlespace Acoustics
- Battlespace Visualizations
- Human Role In Semiautonomous Systems
- Distributed Decision Making

Performance (Performance Enhancement & Protection)

- Molecular Foundations
- Cognitive Performance Optimization
- Directed Energy Systems

Training (Knowledge, Skills & Learning Research)

- Cognitive Modeling
- Continuous Learning
- Immersive Environments

USAF School of Aerospace Medicine

- Distributed Learning
- Aerospace Medicine
- International and Expeditionary Education and Training
- Occupational and Environmental Health

Human Performance Integration Directorate

- Human Performance Optimization
- Human Performance Sustainment



AFRL – Human Performance Wing (RH)

Wright-Patterson AFB, OH

Major Locations

711 HPW Facilities at WPAFB, Ohio

Building 33 & Overhead Connector Bridge to Building 248 – Occupied by 711 HPW/RHCP, Collaborative Interfaces Branch; 711 HPW/RHCV, Battlespace Visualization Branch; 711 HPW/RHPA, Vulnerability Analysis Branch; and 711 HPW/RHAE, Immersive Environments Branch (future). It contains office and lab space for research focused on improving teaming and distributed collaboration cognitive state classification technologies that enable real-time assessment of operator workload, operator capacity to process specific types of information, and operator readiness to make key decisions.

Building 146 - Occupied by 711 HPW/RHCI, Supervisory Control Interfaces Branch. It contains the Crew System Interface Laboratory, a collection of several laboratories including facilities for conducting research in all aspects of human-machine interaction as applied to the operation of semiautonomous and heterogeneous unmanned air systems.

Building 248 - Occupied by 711 HPW/RHCV, Battlespace Visualization Branch; 711 HPW/RHXB, Behavior Modeling Branch; and 711 HPW/RHXS, Sensemaking and Organizational Effectiveness Branch. It includes facilities for conducting research in visual performance and research to enhance the display and manipulation of complex space and cyber information. Additionally, there are labs designed for studies and analyses of intelligence, surveillance, and reconnaissance (ISR); behavioral signatures; prediction/anticipation; and speech translation/recognition research priorities.

Building 441 - Occupied by 711 HPW/CL, staff support, and 711 HPW/RHCB, Battlespace Acoustics Branch. The office and lab space is designed to conduct research towards AF personnel performance enhancement via advanced audio displays in order to maximize the effectiveness of operators in complex multisource environments, to mitigate the adverse effects of acoustic noise on operators, and to dynamically model the propagation of sound.

Building 837 - Occupied by 711 HPW/RHPB, Applied Biotechnology Branch, and the Naval Health Research Center Detachment. These administrative and S&E offices and laboratories are designed for genomics, metabolomics, proteomics, and molecular biology. Additional capabilities include cell, biochemical, tissue culture, metabolism, biokinetics, pharmacodynamics, and analytical chemistry laboratories. It also houses the Naval Health Research Center Detachment, Environmental Health Effects Laboratory.

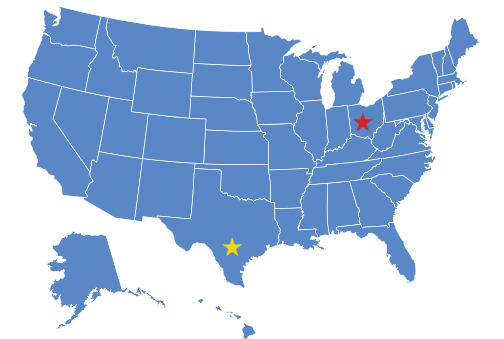
Tri-Service Research Laboratory (TSRL), Ft. Sam Houston, Texas

This future 181,000-square-foot facility will house Air Force and Navy research programs that address the health and safety effects of exposure to a variety of stressors. These programs currently operate in a collection of buildings located at Brooks City Base in San Antonio. The new consolidated facility at Fort Sam Houston is slated for completion in the spring of 2011.

Contact Information

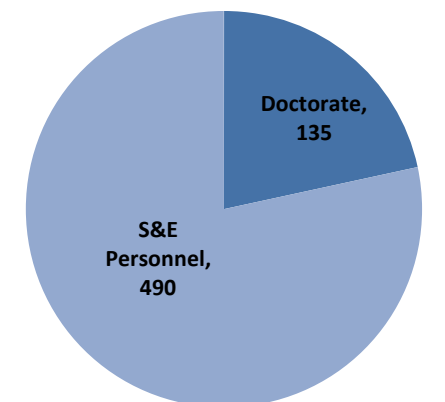
For additional information, visit the AFRL's 711th Human Performance Wing website at <http://www.wpafb.af.mil/index.asp> or contact the Corporate Communications/Marketing Office at 937-255-3814 or by email AFRL.RH.Tech.Info@wpafb.af.mil

RH Sites

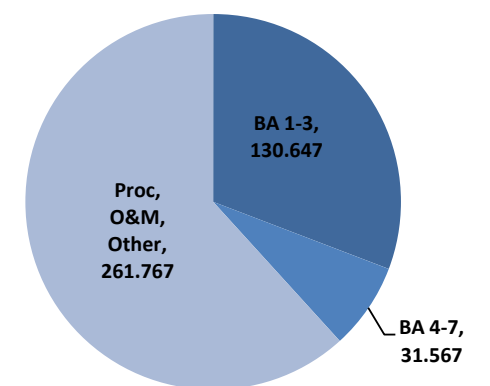


- ★ Wright Patterson AFB, Ohio
- ★ Ft. Sam, Houston, Texas

Human Capital 2010 (total Number)



Budget FY09 (\$ Millions)





AFRL – Information (RI)

Rome, NY

Mission

To lead the discovery, development, and integration of affordable warfighting information technologies for the air, space, and cyberspace forces.

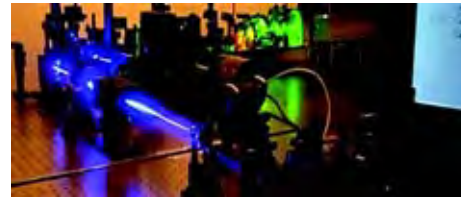
Brief History of the Directorate

Rome Air Development Center (RADC), the predecessor to AFRL Rome Research Site, began operations at Griffiss on June 12, 1951. RADC's mission was the research and development of ground electronics and intelligence systems for the USAF. In 1990, RADC became Rome Laboratory as part of an AF laboratory consolidation. In 1995, the Base Realignment and Closure Commission (BRACC) closed Griffiss Air Force Base but maintained Rome Laboratory as a "stand alone" facility. In 1997, the AF consolidated its laboratories into the Air Force Research Laboratory and established the AFRL Rome Research Site.

The Rome Research Site stands at the location of the former Griffiss Air Force Base, now known as Griffiss Business and Technology Park. Rome Research Site draws on a half-century tradition of excellence researching and developing revolutionary technologies such as troposcatter and satellite communications, long-distance radio, phased array radars, computer networks and software, and electronic reliability tests and standards. RADC was also one of the original 21 nodes of the ARPANET, pioneering the computer network that eventually evolved into the Internet. In 2000, the Information Directorate migrated its portfolio into the information domain. These advances affected not only the nation's military but its citizens' everyday lives. The transistor, the integrated circuit, the personal computer, the laser, and the compact disc, all, at some point, benefited from the research at AFRL Rome Research Site.

Recent/Historical Technical Milestones

- Advanced Speech Enhancement System
- DoDISS Trusted Workstation: To analyze classified data and disseminate actionable information.
- Integrated Information Management System (IIMS): To address issues on data/information gaps, data quality and format.
- Moving Target Information Exploitation (MTIX): It consolidates the view of different data through a Web-enabled environment.
- SEM-E Modules: These modules were applied to F-22s.



Quantum/Optical Information Science Facility



Newport Antenna Measurement and Research Facility

Core Technical Competencies

Advanced Computing Architectures

- Computational Science and Engineering
- Emerging Models and Technologies
- Computing Architectures
- Software Intensive Systems

Command and Control

- Mixed Initiative Planning
- Synchronized Operations
- Continuous Assessment

Connectivity

- Enterprise Management
- Networking
- Information Transmission

Cyber Operations

Information Exploitation (INFO – X)

- Spectral Detection and Geolocation
- Signal Recognition and Analysis
- Information Provenance, Pedigree and Assurance
- Intelligence Systems Architectures

Information Fusion & Understanding

- Perception
- Comprehension
- Anticipation
- Reasoning and Learning

Information Management

- Tactical Information Management
- Enterprise Information Management
- Secure Data Services

AFRL – Information (RI)

Rome, NY

Major Locations

Information Directorate Tech Facility, Rome, NY

The site occupies 892,896 square feet (100 acres) of floor space in six buildings. It features some of the finest research and development facilities in the country, including areas for research in intelligence exploitation, communications networks, information fusion and virtual reality. In August 2009, the construction of additional laboratories and research space began on approximately 28,000 square feet.

Quantum/Optical Information Science Facility, Rome, NY

This facility supports research and development of emerging quantum computing and optical processor architectures. The current focus is on linear optics quantum computing and optical interconnects for high-performance computing.

Condor Cluster Facility, Rome, NY

AFRL/RI is designing, integrating and building the largest interactive computer in the USAF using Sony Playstation3 (PS3) game consoles and other off-the-shelf commercially available components. The "Condor Cluster" consists of 1,760 PS3s and 168 high-end graphics cards, known as General Purpose Graphic Processor Units (GPGPU). Condor is a "green" supercomputer, designed to consume significantly less energy than comparable supercomputers. It can achieve approximately 1.5 GigaFLOPS per Watt of computing power, where a typical supercomputer achieves only 100 MegaFLOPS per Watt. A primary application of Condor is radar image processing for urban surveillance, creating a detailed image of an entire city from radar data.

Stockbridge Communications, Antenna, and Unmanned Aerial System Test and Research Facility, Rome, NY

There is a 5,800 square-foot building for office space, a laboratory area, operations and control center and a 4,000 square-foot building used for equipment modification to support various research/development and test programs and experiments, maintenance and storage. Two 60 x 600-foot runways and associated ground infrastructure support research, development and experimentation of airborne communications and networking technologies using Small Unmanned Aerial Systems (SUAS) platforms. The Stockbridge facility infrastructure provides a unique set of capabilities to support real-world experimentation and analysis of communications, sensing and exploitation technologies in a relevant, real-world operating environment.

Newport Antenna Measurement and Research Facility, Newport, NY

This facility is used to perform RDT&E on antennas and antenna systems in a far field "free space" environment to determine radiation pattern changes due to airframe effects, to evaluate antenna-to-antenna system coupling and to support an advanced antenna measurement technology development. This facility provides the capability to conduct accurate repeatable measurements of the performance of antennas installed on airframes, complex multi-beam and phased arrays, advanced ultra low sidelobe arrays and multiple antenna systems, and to conduct advanced antenna measurement technology research without costly flight time. It consists of six outdoor ranges. The two primary ranges are between two hills at 7250 feet and 6460 feet in length with a 430-foot valley in between.

Contact Information

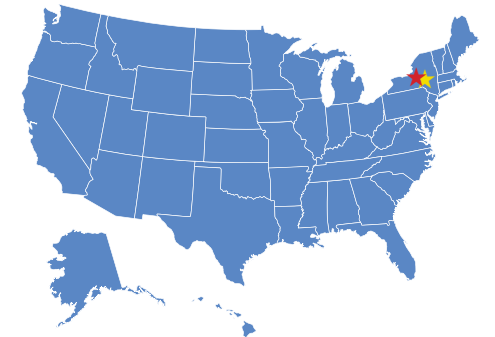
For additional information, visit the AFRL's Directed Energy website at <http://www.wpafb.af.mil/afri/ri/> or contact:

Dr. Paul Phister
Email: Paul.Phister@rl.af.mil
Phone: 315-330-3315

Joseph Turczyn
Email: Joseph.Turczyn@rl.af.mil
Phone: 315-330-3047

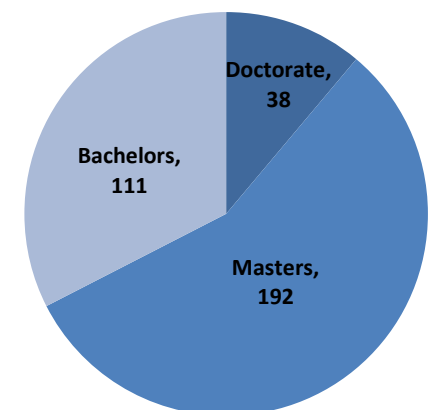


RI Sites

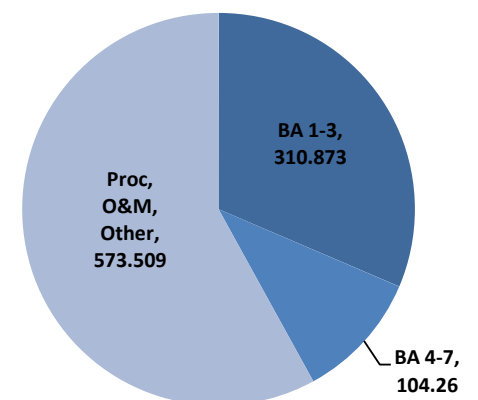


- ★ Rome, New York
- ★ Newport, New York

Human Capital 2010 (total Number)



Budget FY09 (\$ Millions)





AFRL – Space Vehicles (RV)

Kirtland AFB, NM

Mission

To develop and transition innovative, high-payoff space technologies supporting the warfighter, while leveraging commercial, civilian, and other government space capabilities that ensure America's advantage in space.

Brief History of the Directorate

AFRL's Space Vehicles Directorate utilizes the assets and personnel of the former Phillips Space Technology, Space Experiments, and Geophysics Directorates, and the former Phillips Lasers and Imaging Directorate, now called the Directed Energy Directorate, also located at Kirtland Air Force Base, New Mexico. Space Vehicles consists of three technical divisions: the Battlespace Environment Division, the Spacecraft Technology Division and the Integrated Experiments and Evaluation Division. The Battlespace Environment Division detects and understands aerospace environmental threats to warfighting systems to provide active and passive means that eliminate or mitigate such threats. Its main research areas include space weather, data exploitation, imaging and surveillance. The Spacecraft Technology Division develops next-generation spacecraft bus and payload technology elements to reduce cost, improve performance and enable new missions. Its main technology research areas include electronics, components, sensing and communications. Finally, the Integrated Experiments and Evaluation Division works to prove advanced technologies and concepts through flight experiments, simulation and technical assessment, and integration and test facilities.

Recent/Historical Technical Milestones

- The Communication/Navigation Outage Forecasting System (C/NOFS): A technique for locating and forecasting scintillations in the low-altitude ionosphere.
- High Scout, a Combined Unmanned Air Vehicle (UAV)/Airship Configuration: A combined UAV/airship configuration.
- Plug-and-Play Satellite (PnPSat): For use on tactical and larger satellites.
- CubeFlow-Plug-n-Play NanoSat Course: With a focus on the applications of nanosatellites.
- Tactical Satellite-3 (TacSat-3) Spacecraft: With an on onboard processor to provide real-time data to the combatant commander in the theater of interest.

Major Locations

Aerospace Engineering Facility, Kirtland AFB, New Mexico

The 16,500 square-foot facility includes a 60-foot tall, 4,500-square-foot high-bay laboratory for assembly testing of spaceflight hardware, including an overhead rail system with two 7.5 ton cranes. The facility includes a 600 square foot, class-100 clean room; a class-10,000 clean tent; three environmental chambers; a thermal vacuum chamber; three vibration tables; a 10' x 14' x 8' copper screen room for electromagnetic testing; and a machine shop for hardware fabrication.

Battlespace Environment Laboratory, Hanscom AFB, Massachusetts

Currently under construction, the 145,000 square-foot laboratory includes high-vacuum environments, as well as capabilities for performing environmental calibration, chemistry and spectrometry, computer modeling, space data processing, space operations, remote sensing, and quantum computing investigations.



Quantum/Optical Information Science Facility



Newport Antenna Measurement and Research Facility

Core Technical Competencies

Space Situational Awareness

- Space Weather
- Sensing for SSA
- Knowledge Tools/Fusion
- Satellite Control
- Space Communications

Defensive Space Control

- Remediation Technologies
- Space Electronics
- Space Protection
- Modeling, Simulation, Evaluation & Analysis

Intelligence, Surveillance and Reconnaissance

- Sensing for ISR
- Space Power
- Nuclear Explosion Monitoring

Responsive Space

- Integrated Structures
- Bus Technologies
- Autonomous Checkout and Fault Detection
- Ballistic Missile Technology



AFRL – Space Vehicles (RV)

Kirtland AFB, NM



Distributed Architecture Simulation Laboratory (DASL), Kirtland AFB, New Mexico

The DASL is a 1,500 square foot, state-of-the-art modeling and simulation (M&S) laboratory. It is an open storage facility capable of supporting both unclassified and classified system simulations. Further, the DASL is a modular, human-and-hardware-in-the-loop, end-to-end system simulation test bed capable of evaluating technology models, hardware, and space experiment mission software. The facility operates interactively in real or regimented time and can perform both parametric and Monte Carlo-type evaluations. The data center warehouses both simulation and experimental data and supports information mining conducted by on-site and remote customers.

High-Frequency Active Auroral Research Program (HAARP), Gakona, Alaska

HAARP provides capabilities for conducting experimental research on high-power, radio wave interactions in the ionosphere and space. The high-frequency transmitting system, completed in February of 2007, consists of 180 antenna elements arranged as a rectangular array of 15 columns by 12 rows, providing a radiated power of 3,600 kW. The program is jointly managed by the Space Vehicles Directorate and the Office of Naval Research.

Infrared Radiation Effects Laboratory (IRREL), Kirtland AFB, New Mexico

The IRREL provides radiometric and radiation characterizations for focal plane arrays (FPA) and associated devices using government-furnished equipment. The data and analyses produced by this laboratory are vitally important in determining the overall performance and radiation hardness of devices for use in space applications. This effort includes the development of innovative techniques for advancing the state-of-the-art characterization of infrared and visible FPAs and associated devices, including the development of characterization and analytical techniques, test hardware, and operational and test procedures that advance the experimental capabilities of the IRREL.

Microelectronics Test and Measurement Laboratory, Kirtland AFB, New Mexico

The Microelectronics Test and Measurement Laboratory contains numerous X-ray-producing sources to accomplish a variety of radiation-effects testing on advanced microelectronic devices. The facility contains a low-energy X-ray source and the (ARACOR) for both packaged parts and integrated circuits residing on wafers, a Cesium 137 source to simulate the dose rates achieved on orbit, a Flash X-ray source driven by a Febetron Pulser to simulate an enhanced radiation environment, and an electric pulser-driven e-beam vacuum tube. In addition, the facility owns and operates a source for producing a relatively robust fluence of gamma rays to provide significant doses to integrated circuits, packaged parts, systems, and satellites.

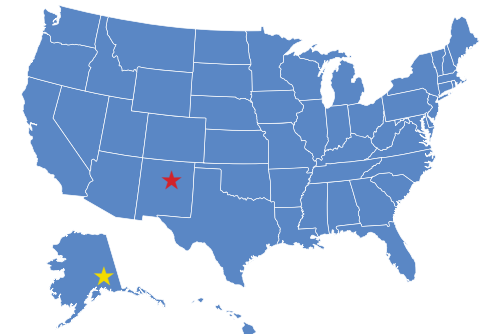
Spacecraft Component Laboratory, Kirtland AFB, New Mexico

The Space Component Laboratory contains a 7,500 square-foot composites fabrication laboratory, a machine shop with various prototyping equipment (including computer-controlled machining), a 2,200 square-foot room with multiple ovens and autoclaves, an 800 square-foot materials testing laboratory, a 8,600 square-foot space structures testing laboratory with large-scale static load frames, a 2,000 square-foot photovoltaic laboratory and a Responsive Space Test Bed where contractors can bring PnP technologies for tryout with other PnP systems.

Contact Information

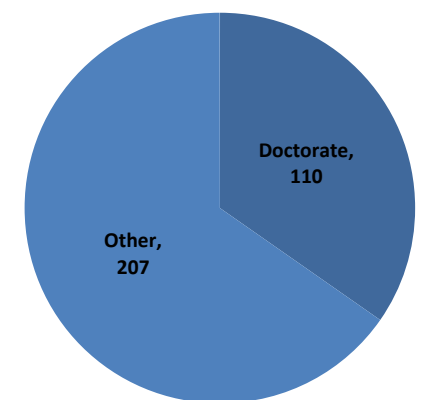
For additional information, visit the AFRL's Space Vehicle website at http://www.kirtland.af.mil/afrl_vs/ or contact the Corporate Communications/Marketing Office at 505-846-6315 or by email AFRL.RV.Corp.Com@kirtland.af.mil

RV Sites

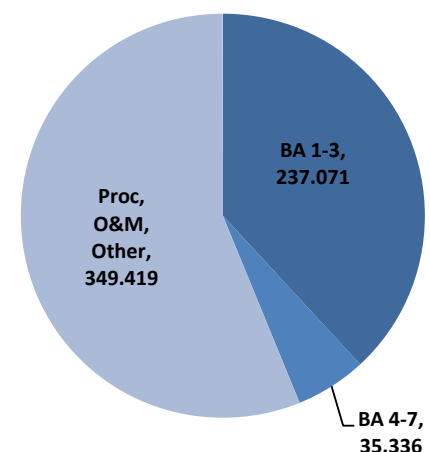


- ★ Kirtland AFB, New Mexico
- ★ Gakona, Alaska

Human Capital 2009 (total Number)



Budget FY09 (\$ Millions)





AFRL – Munitions (RW)

Eglin AFB, FL

Mission

To lead the discovery, development, integration, and transition of affordable precision engagement technologies for the air, space, and cyberspace force.

Brief History of the Directorate

The roots of the Air Force Research Laboratory Munitions Directorate (AFRL/RW) can be traced to air armament efforts initiated at Eglin Field during the early stages of World War II. Since this early start, development of high-speed jet aircraft outpaced the development of conventional air armament and created the dilemma of using modern fighter bombers to deliver World War II-vintage munitions. Sparked by the heightening Vietnam conflict, research and development activities for non-nuclear armament were accelerated. On March 1, 1966, the predecessor to the Munitions Directorate, the Air Force Armament Laboratory (AFATL) was created to provide a community of scientists, engineers, and infrastructure to advance conventional weapons technology. From the unit's inception, the research and development efforts focused on user needs. The significance of applying leading-edge technology to provide the user with the state-of-the-art weaponry makes a dramatic impact on the outcome of any given strike mission. Technology endeavors over recent years have manifested themselves in a variety of non-nuclear air armament, some of which were employed in effective "surgical" strike operations in Libya and Desert Storm.

Today, the Munitions Directorate is a part of the AFRL and continues to make technological breakthroughs for future air armament. The Directorate's emphasis is on the weapon's capability to operate with complete autonomy and high accuracy when delivered against ground targets in all weather conditions, day or night, using long- or short-range delivery tactics. Air-to-air missiles benefit from this technology with increased single shot kills and larger "no-escape" zones. In addition, advances in hard-target penetrating warheads are supplying mission flexibility by providing a conventional armament capability to defeat targets traditionally reserved for nuclear weapons. In summary, paramount to every AFRL/RW technology decision is the answer to the question, "What does it do for the warfighter?"

Recent/Historical Technical Milestones

- GBU-28, "Bunker Buster".
- Joint Direct Attack Munition (JDAM) - GBU-31/32/38.
- Small Diameter Bomb (SDB) and Focused Lethality Munition (FLM).
- 3D-Landing Zone Brownout Landing Technology.
- 540mm Target Round.



An AC-130 Gunship fires a 540mm target round



AREEF Wind Tunnel -- Research & Engineering Education Facility (REEF)

Core Technical Competencies

Ordnance

- Fuzes
- Energetic Materials
- Damage Mechanisms
- Ordnance Sub-system Integration

Advanced Guidance

- Integrated Sensing & Processing Sciences
- Weapon Dynamics & Control Sciences
- Weapon Seeker Sciences
- Guidance Sub-System Integration

Munition Systems

- System of Systems Integration and Demonstration
- Multi-functional Airframe Science and Integration

Modeling & Simulation

- Guidance Sub-System Integration
- Computational Physics
- Concept and Terminal Effects Research



AFRL – Munitions (RW)

Eglin AFB, FL

Major Locations

AFRL/RW Research Complex, Eglin AFB, Florida

Home to directorate testbeds, several labs, and a technical library, as well as operation and support management, this complex supports all of the RW core technical capabilities. It includes the Advanced Guided Weapon Testbed, Electro-optics and Millimeter Wave Lab, Advanced Navigation Laboratory, Environmental Science Laboratory, Prototype Munition Fabrication Lab, Technical Library, and Kinetic Kill Vehicle Hardware in the Loop Simulator (KHLS), as well as the operations and management of the entire directorate.

Advanced Warhead Experimentation Facility (AWEF), Eglin AFB, Florida

In support of our Damage Mechanisms Core Technical Competency, this facility includes the Warhead Evaluation Arena (C64-A), Terminal Ballistics Evaluation (C-64C), Indoor Warhead Test Lab (C-64C), Reusable Test Lab (RUT) and Blastpad, all of which enable RW's continued advancements in damage mechanisms sciences including computational physics, materials science, energy conversion and energy coupling.

Fuze Research & Develop Facility, Eglin AFB, Florida

The following areas support our Fuze Technology Core Technical Competency: the Initiation Characterization Lab, Target Detection Sim Chamber, a large outdoor test range over a couple of hundred acres, gun sys for harsh environment simulation, munition storage and handling, Hardware-in-the-loop and shock testing, as well as fuze assembly. The Fuze Experimentation Facility (FEF) is the Munition Directorate's center for Shock Hardened Data Recorder Research and is currently under expansion.

High Explosives Research & Development Facility (HERD), Eglin AFB, Florida

With over a hundred acres and numerous buildings, this facility supports our Munition Energetics Core Technical Competency and includes a Properties Lab, Processing Lab, Advanced Energetics Lab, and Dynamics Testing and X-Ray Lab.

Seeker Technology Research & Evaluation Facility (STRAEF), Eglin AFB, Florida

This facility houses the Munitions Directorate's main support for our Terminal Seeker Core Technical Competency with exceptional electrical and optical prototyping capability, along with an expansive outdoor range with 24-hour lasing capability.

Seeker Phenomenology Evaluation & Research (SPEAR), Eglin AFB, Florida

The facility was completely refurbished early in 2010 to enhance RW's Core Technical Competency in Terminal Seekers. It has two large buildings that contain a component testing lab, location for indoor range for prototype testing, access to an outdoor range, office and conference space, and future electronics manufacturing and test capabilities.

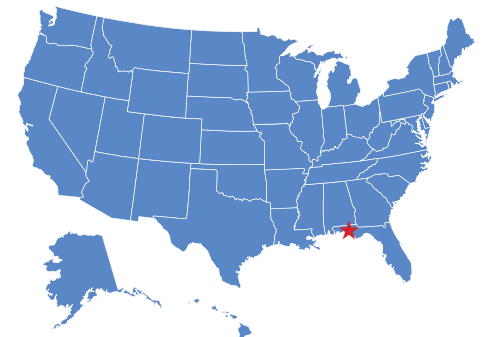
Research and Engineering Education Facility (REEF), Eglin AFB, Florida

The Munitions Directorate partners with University of Florida - one of the world's finest engineering programs - and provides a state-of-the-art facility in support of the Munitions Aerodynamics, Guidance and Navigation and Control Core Technical Competency. Operations include conducting technical research critical to the advancement of national defense and security capabilities.

Contact Information

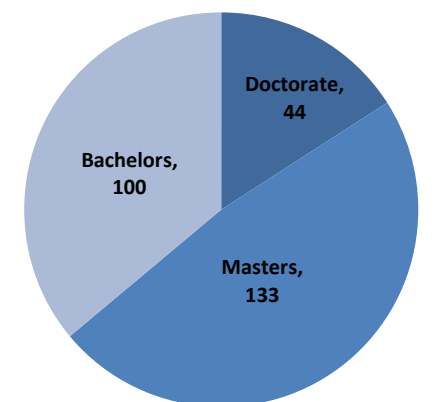
For additional information, visit the AFRL's Munitions' website at <http://www.eglin.af.mil/units/afrlmunitionsdirectorate/index.asp> or contact the 96ABW/PA Public Affairs Office at 850-882-3931 or by e-mail at 96abw.pa@eglin.af.mil.

RW Sites

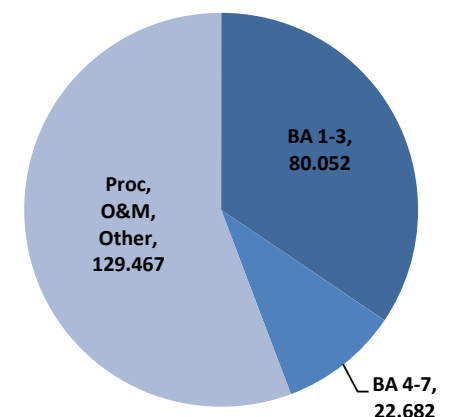


★ Eglin AFB, Florida

Human Capital 2010 (total Number)



Budget FY09 (\$ Millions)





AFRL – Materials and Manufacturing (RX)

Wright Patterson AFB, OH

Mission

To develop materials, processes, and advanced manufacturing technologies for aircraft, spacecraft, missiles, rockets, and ground-based systems and their structural, electronic and optical components. AF product centers, logistic centers, and operating commands rely on the directorate's expertise in metallic and nonmetallic structural materials, nondestructive inspection, materials used in aerospace propulsion systems, sensor materials, laser-hardened materials, systems support, and advanced manufacturing methods to solve system, expeditionary deployment, and operational challenges.

Brief History of the Directorate

Early in 1919, the Engineering Division of the Army Air Service organized a Material Section at McCook Field and assumed a position of leadership in aeronautical materials research. A heavy concentration of work was associated with wood, because it was one of the major items in airplane construction. During the 1920s, extensive research was conducted in lightweight metals and armor plate, as well as aircraft tires and balloon cloth. The search for substitutes for glass windows led to the development of a plastic material for this purpose in 1937, and in 1939, the Materials Branch became the Materials Laboratory.

During the war, much of the research focused on developing substitutes for aircraft materials in short supply. High-speed aircraft developed after the war directed a great deal of attention toward development of coatings resistant to rain erosion damage. Further research included high temperature materials, new concepts and approaches to the preparation of ceramic powders. Over the years, research has evolved to include programs in nanotechnology, biotechnology, ceramics, robotics and laser hardened materials.

In 1997, a major reorganization of the Air Force's science and technology program combined the former Wright Laboratory Manufacturing Technology Directorate at Wright-Patterson AFB, the former Armstrong Laboratory Environics Directorate, and the former Airbase Structures Branch of Wright Laboratory's Flight Dynamics Directorate at Tyndall AFB, FL, with the Materials Directorate to form the Directorate as it is today. The Directorate also manages the Air Force Corrosion Control Program Office at Robins AFB, Georgia; the Air Force Nondestructive Inspection Office at Tinker AFB, Oklahoma, and the Air Force Advanced Composites Office at Hill AFB, Utah.

Recent/Historical Technical Milestones

- Defense Advanced Research Projects Agency (DARPA): An engine system prognosis unit .
- Robotic Refueling System for the F-35 Joint Strike Fighter: An alternative to manual refueling.
- Communications Satellite Antenna Reflector: A new, lightweight, portable dish 60 percent lighter than its aluminum predecessor.
- Conformal Load-bearing Antenna Structures (CLAS): A cost-effective alternative to current generation antenna systems.



Robotic refueling system for the F-35 Joint Strike Fighter



The All-Purpose Remote Transport System (ARTS) perform range clearance functions with its flail attachment

Core Technical Competencies

Materials & Processes

- Optical and Infrared Materials
- High Temperature Metals
- Ceramics
- Hybrids

Materials Applications

- Electromagnetic Materials Integration
- Thermal Science and Materials
- Materials Biotechnology
- Nanomaterials
- Nondestructive Evaluation

Support for Operations

- Systems Support
- Agile Airbase Engineering

Manufacturing Technology

- Manufacturing Readiness
- Industrial Readiness



AFRL – Materials and Manufacturing (RX)

Wright Patterson AFB, OH

Major Locations

Airbase Sciences Laboratories, Tyndall AFB, Florida

Its purpose is to conduct basic and applied research in microbiology, applied biochemistry, airbase material science, reactive materials, and chemical dynamics. Research focuses on development of materials and capabilities providing solutions to airbase infrastructure and force protection deficiencies. The main capabilities include unique microwave and aerosol facilities, and a wide range of environmental chambers. Instrumentation includes GC, high-resolution mass spectrometry, FTIR and Raman spectroscopy, X-ray diffractometry, atomic force and scanning electron microscopy, and other analytical equipment.

Fire Test Ranges, Tyndall AFB, Florida

Its purpose is live fire experimentation and demonstrations of firefighting apparatus, application systems, and agents on components up to and including full size large aircraft models. It provides a safe permitted area for extinguishing JP-8 fires using representative C-130 and heavy transport aircraft models. Its capabilities include a fully instrumented test facility using JP-8 as fuel (unique because of EPA groundwater considerations) and a 60-foot-high aircraft model (containing 190,000 lbs of one-quarter-inch plate steel).

Molecular Modeling Laboratory, Wright Patterson AFB, Ohio

Its purpose is to design advanced materials and guide experimental materials research, development and testing efforts. Its capabilities include a full range of molecular modeling techniques including Hartree-Fock, post-Hartree-Fock, and Density Functional abinitio methods, semi-empirical methods, molecular mechanics, and molecular dynamics for gas, solution and solid state materials.

Opto-Electronic Polymer Physics Laboratory, Wright Patterson AFB, Ohio

Its purpose is to investigate and develop the physical mechanisms of polymers for applications in photovoltaics, conductivity, optics, electronics, and other AF technological needs. Its capabilities include DC conductivity (4-probe and Van der Pauw), AC impedance and dielectric measurement; photovoltaic spectral, efficiency, and frequency response; time of flight mobility; photo-induced absorption; uv-vis-nir absorption, luminescence. It provides computer automated photovoltaic characterization; conducting polymer research; integrated multi-disciplinary environment including chemical synthesis, sample/device fabrication and characterization.

Space Combined Environment Facility, Wright Patterson AFB, Ohio

Its purpose is to evaluate the effects of space exposure on thermal control materials. Its capabilities include vacuum: 5 x 10⁻⁷ Torr; Ultraviolet: 1-3 EUVS; Temperature: 80°F - 150°F; Electron: 1012e⁻/cm/sec @ up to 20 KeVs. It provides space simulation, including vacuum/ultraviolet/electron provides ability to assess performance of materials in a space environment.

Thin Film Deposition Tribology Laboratory, Wright Patterson AFB, Ohio

Its purpose is to research and develop thin-film coatings for use on surfaces that are susceptible to friction and wear. Its capabilities include pulsed laser deposition, filtered Cathodic Arc deposition; magnetron sputter deposition of thin-film coatings with accurately controlled chemical, mechanical, friction and wear properties and behavior during wear testing.

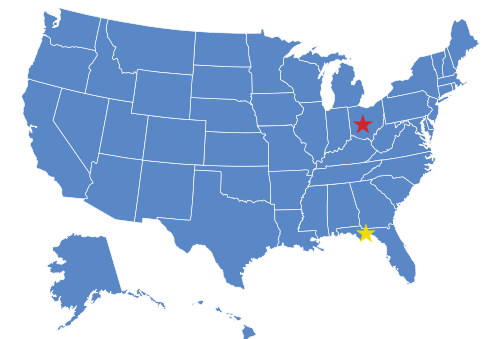
Virtual Reality for Materials Design Laboratory, Wright Patterson AFB, Ohio

Its purpose is to research and develop materials through applied virtual reality to enable interactive "materials-by-design." Its capabilities include extensive theoretical and computational materials science and engineering capabilities that include utilization of scalable Defense Department High Performance Computing machines. It also has a molecular docking capability in a virtual reality environment with tactile feedback that provides the means for interactive molecular design for multiple molecular systems.

Contact Information

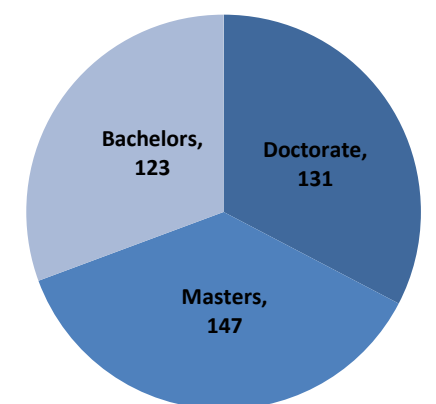
For additional information, visit the AFRL's Materials and Manufacturing website at <http://www.wpafb.af.mil/afrl/rx/> or contact Derek Kaufman (937- 672-3522) or Daryl Mayer (937- 672-3525) at the 88th Air Base Wing Public Affairs.

RX Sites

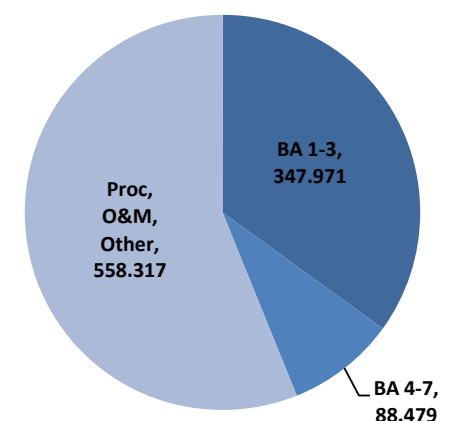


- ★ Wright Patterson AFB, Ohio
- ★ Tyndall AFB, Florida

Human Capital 2010 (total Number)



Budget FY09 (\$ Millions)





AFRL – Sensors (RY)

Wright-Patterson AFB, OH

Mission

To lead and provide sensor and countermeasure technology enabling complete freedom of air and space operations for U.S. warfighters and homeland security. These technologies help find and precisely engage the enemy and eliminate its ability to hide or threaten U.S. forces. In collaboration with other AFRL directorates and DoD organizations, the directorate develops sensors for air and space reconnaissance, surveillance, precision engagement and electronic warfare systems.

Brief History of the Directorate

The Sensors Directorate was formally called the “Avionics Directorate” and “Avionics Laboratory”. The Sensors Directorate has been instrumental in leading the development of all avionics equipment and systems since 1918. The 1950s saw the emergence of the first stage of an avionics transformation paradigm – a standard suite of equipment that provided virtually all the functions found today: communications, navigation, crew stations displays, flight management, target search, fire control and weapon management, and threat warning and countermeasures. In the 1970s, technology development became the responsibility of the Sensors Directorate.

Digital technology and general purpose computers created spectacular gains in capabilities but maintenance and support costs continued to be a barrier. Avionics system costs grew to one-third of the total system acquisition costs, threatening to erode the AF’s force structure. The Sensors Directorate facilitated a systemic approach to the exploitation of technologies, developing core elements, hardware and software, common bus structures and standard interfaces that increased the cost effectiveness of the systems.

The Sensors Directorate (AFRL/RY) is located at Hanscom Research Site (HRS) Det 1 at Boston, Massachusetts, and Wright Research Site (WRS) Det 1 at WPAFB, Ohio. RY’s HRS activities specialize in basic and exploratory research exploring the electromagnetic spectrum from deep ultraviolet to millimeterwaves to satisfy growing warfighter needs by creating and transitioning cost effective electronic and optical technologies. RY’s WRS activities specialize in developing technologies for target and threat discrimination, location, and identification using RF, EO, and information sources; and conducting advanced development field and flight test demonstrations of platform specific sensors and functionally integrated sensor suites for air and space vehicles.

Recent/Historical Technical Milestones

- Angelfire: A system that supports IRAQI FREEDOM operations with unparalleled speed and performance.
- Large Aircraft Infrared Countermeasures [LAIRCM] System: it defeats the threat missile guidance system by directing a high-intensity modulated laser beam into the missile seeker.
- Advanced Responsive Tactically-Effective Military Imaging Spectrometer (ARTEMIS): successfully transitioned into the Tactical Satellite-3 (TACSAT-3).
- Technology Transition: “GaN Spatial Power combiner for Class B Push-Pull Amplifier”: To include implementation of high power GaN and GaAs MMIC.
- Miniature Digital Receiver/Exciter (MDREX): A single chip implementation of receiver/exciter functionality (100x SWaP reduction).



Laser Radar Tower



Image of the Kilauea Volcano in Hawaii, taken by the TacSat-3

Core Technical Competencies

Radio Frequency Sensing

- Assured Reference
- RF Phenomenology, Waveforms, and Processing
- Active RF Sensing
- Passive RF Sensing

Electro-Optical Sensing

- Long Range Target Detection and Identification
- Sensing in Dynamic Urban Environments
- Concept Exploration and Sensor Components
- Tailored Customer Applications

Net-Centric Spectrum Warfare

- Layered Effects
- Cognitive Adaptive EW
- EW/Network Warfare Techniques
- Electronic Protection
- Collaborative Sensing System of Systems Architecture (CSOSA)
- Automatic Secure Sensing

Electro-optical Electronic Warfare

- Missile Warning
- Laser Warning
- Proactive EO/IR Countermeasures
- Multi-Spectral Laser Sources

Automatic Target Recognition / Performance Based Sensing

- Data Services
- RF and EO Signature Understanding
- Performance Modeling

Enabling Sensor Devices / Components

- Metamaterials Exploration
- Optoelectronics Technology
- Devices for Sensing
- EO Components
- Highly Integrated Microsystems
- Antenna Technology
- RF/EO Subsystems

AFRL – Sensors (RY)

Wright-Patterson AFB, OH

Major Locations

Outdoor/Indoor Range, Wright-Patterson AFB, Ohio

This location consolidates the Outdoor Range mission of R&D for space and airborne radar sensor concepts and improvements for cost effective enhancement of detection, track and handoff of small maneuvering airborne and ground-based targets. The mission consolidation includes relocation of three radar systems (L, S, and C-Band radars) and one passive system (ESM sensor/Bistatic radar). The Indoor Range is a multi-mode R&D RF chamber for accommodating multiple research missions in antenna pattern research, radar cross section (monostatic and bistatic nearfield), tomographic, and radar system evaluation. The large chamber will operate at 400MHz to 18GHz, with a quiet zone of 12’ x 12’.

Laser Radar Tower, Wright-Patterson AFB, Ohio

The laser radar tower is part of a short-range testing of electro-optic sensor technologies against actual atmosphere and clutter. This facility provides an environment for LADAR experimentation, building and testing low TRL level systems, and phenomenology experiments. The elevation offers a lab space with access to WPAFB campus for limited range testing of systems. Capacities: Two optical tables with enclosures, one gimbal, pan tilt heads for scanning electro-optical sensor systems, CIDRR Sensor, LW-FLIR, MW-FLIR, SWIR, NIR, and Visible cameras, Laser sources.

Integrated Demonstrations and Applications Laboratory (IDAL), Wright-Patterson AFB, Ohio

IDAL is a legacy state-of-the-art in-house applications research capability with over 40 years of experience. IDAL conducts Radio Frequency (RF) applications research through man-in-the-loop/hardware-in-the-loop multi-spectral synthetic battlespace simulation. The IDAL simulators generate a high-fidelity signal environment where real-time research is conducted that rapidly develops, integrates, matures, demonstrates and transitions RF sensor technologies/ capabilities.

DIME Laboratory, Wright-Patterson AFB, Ohio

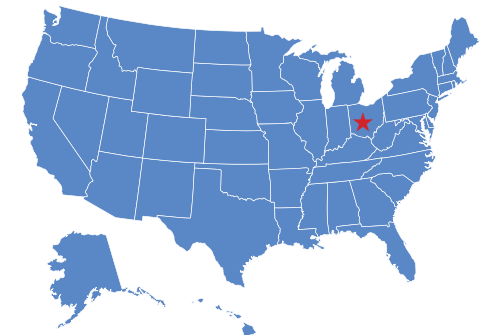
The DIME lab conducts R&D of advanced electro-optical and infrared countermeasures (EO/IRCM) techniques against infrared missile seekers. Its capabilities include the exploitation of advanced threat missile seekers (circuit analysis, theory of operation, system characterization, concurrent digital model development); HWIL CM evaluation (6-degree-of-freedom flyout simulator, multi-spectral source and extended targets); target signature generation and analysis (multi-spectral aircraft imagery, advanced threat tracking algorithm simulation, field data acquisition and flight test support).

Contact Information

For additional information, visit the AFRL’s Sensors website at <http://www.wpafb.af.mil/afrl/ry/> or contact AFMC 88th ABW/PA, John Klemack, Director, Office of Public Affairs, at 937-257-8559.

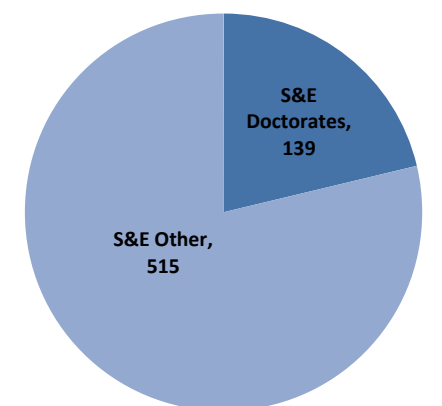


RY Sites

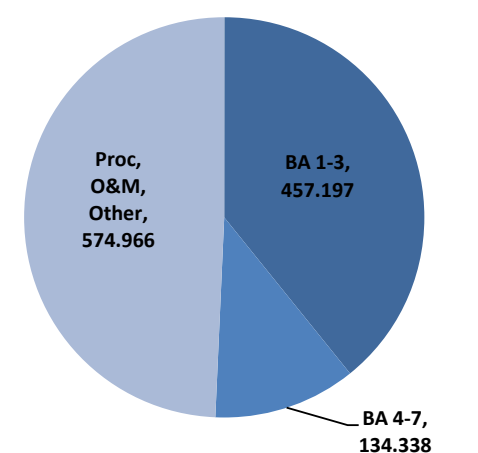


★ Wright Patterson AFB, Ohio

Human Capital 2010 (total Number)



Budget FY09 (\$ Millions)





AFRL – Propulsion (RZ)

Wright-Patterson AFB, OH

Mission

To be the source of a complete spectrum of advanced propulsion technologies for the nation's military services. Through partnerships with industry, the directorate has become a principal provider of propulsion technologies to aircraft and rocket engine manufacturers serving commercial enterprises as well. In addition to providing propulsion technologies for aircraft, rockets, and spacecraft, the directorate also conducts leading edge research and development in aerospace fuels, propellants, and power generating systems.

Brief History of the Directorate

In 1917, McCook Field near Dayton, Ohio, was dedicated as an experiment and engineering site. The AFRL Propulsion Directorate began there as the Power Plant Section of the Aircraft Engineering Division under the U.S. Army Signal Corp's Airplane Engineering Department. Propulsion development challenges began immediately with the onset of WWI and a massive demand for high-powered piston engines that could be rapidly produced and provide needed battlefield reliability.

With proven success, the Directorate remained in the forefront of pioneering piston engine advancements into the 1920s through the mid 1940s, introducing the birth of on-board power generation, refining the propeller, turbo and supercharged engines, ultimately providing the engine power to win WWII. Propulsion technology leadership continued into the jet age of the 1950s and 1960s with the development and advancement of the country's best performing turbojet, turbofan, turboshaft and turboprop engines.

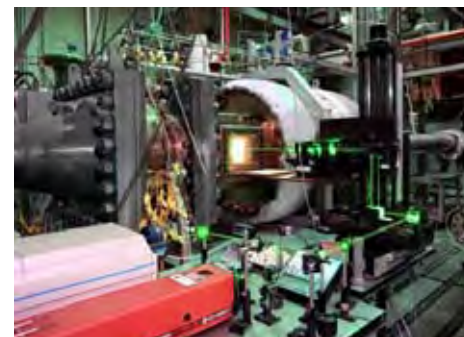
The Directorate has become the center of excellence for propulsion system research and development for both aircraft and spacecraft propulsion, including fuels and propellants, high speed flight, and power and thermal management technologies. Today, the Directorate consists of the Turbine Engine Division, Aerospace Propulsion Division, and Energy/Power/Thermal Division all located at Wright-Patterson AFB, Ohio; and the Space and Missile Propulsion Division which is located at Edwards AFB, California.

Recent/Historical Technical Milestones

- X-51A Waverider: The first test vehicle to successfully make the longest ever supersonic combustion ramjet-powered hypersonic flight.
- Portable Electronic Power Supply Aeromedical Evacuation System (PEPSAE): A power system to be used during transport of critical care patients from theatre.
- First AF Biofuel Flight: A flight totally powered by a biofuel blend.
- Small Engine Research Laboratory: A specialized facility with the objective of optimizing performance for small-scale propulsion and power systems.
- Manufacturing and Testing of a 15-lb Solid Rocket Motor.



X-51A Waverider flight test vehicle



The Supersonic Combustion Research Facility

Core Technical Competencies

Turbine Engines

- Thermodynamic Efficiency Enhancements
- Broad Base Engine Performance Optimization
- Scaling Effects on Engine Efficiency, Durability, Safety, Readiness and Environment
- Fielded and Emerging Turbine Engines
- Innovative Engine Technologies

Space and Missile Propulsion

- Technology for the Sustainment of Strategic Systems
- Spacecraft Propulsion
- Space Access Propulsion

High Speed/Hypersonics

- Expendable Scramjet Propulsion
- Reusable Scramjet Propulsion
- Combined Cycle Propulsion Integration

Energy, Power and Thermal

- Energy Optimized Aircraft
- Megawatt Class Power and Thermal
- Special Purpose Power
- Battlespace Fuels

AFRL – Propulsion (RZ)

Wright-Patterson AFB, OH

Major Locations

The Compressor Research Facility, Wright-Patterson AFB, Ohio

It supports exploratory and advanced development efforts in compressor technology, independently evaluating full-scale, multi-stage, one or two-spool three-flow fans and compressors under operating conditions similar to actual flight profiles. It is used to determine the aerodynamic and aeromechanical performance of the most advanced compressors and fans in the world, while enhancing the understanding of their complex internal flow physics.

The Turbine Research Facility, Wright-Patterson AFB, Ohio

It is used for exploratory development of advanced turbines. It simulates multiple engine operating conditions through the use of aero and thermodynamic similarity in a short duration (transient) test procedure. Advanced, full-scale rotating turbine hardware is evaluated using fast response, nonintrusive instrumentation that measures high frequency surface heat flux, unsteady pressures, inlet and outlet conditions, secondary flows, mass flow, and various other quantities. Turbines as large as 34 inches tip diameter and as small as 17 inches hub diameter can be accommodated. A cryogenic cooling system provides a range of temperature ratios for fully cooled hardware.

The Supersonic Combustion Research Facility, Wright-Patterson AFB, Ohio

This is a continuous flow supersonic tunnel, specifically designed for optical diagnostics of fuel injection (for mixing and penetration), shock boundary-layer interactions, flameholder operation, and other hypersonic-flow components. The facility is housed in a climatically controlled, clean laboratory and allows continuous flow operation at air mass flow rates up to 30 lbm/s.

The Assured Aerospace Fuel Research Facility (AAFRF), Wright-Patterson AFB, Ohio

It provides a test bed for collaborative efforts between the Government, Industry and Academia that will foster collaborative research required to reduce dependence upon foreign energy sources. The goal of the AAFRF is to advance research in non-petroleum based fuels and fuel feed stocks which can be domestically produced in quantities sufficient to satisfy DoD requirements.

The Solid Propulsion Complex (Area 1-32), Edwards AFB, California

It consists of four main facilities along with support facilities and explosive storage bunkers. Pads 1 and 2 are designed to statically fire solid rocket motors at ambient pressures with thrust ratings up to one million pounds.

The Liquid Propulsion Complex (Area 1-14 and 1-120), Edwards AFB, California

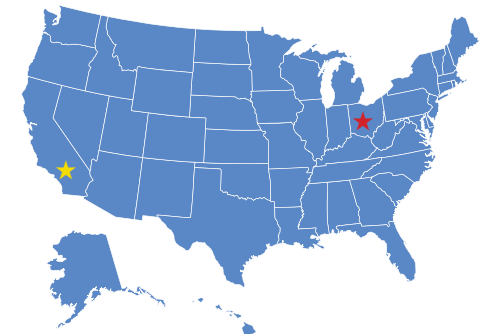
It supports research and development of both small/sub-scale engine development (Area 1-14) and large-scale component and engine development (Area 1-120). Area 1-14 is used for experiments involving a number of approaches, using any of five test cells for static testing of liquid propellant engines; dynamic load effects created by a centrifuge; or liquid propellant flow distribution measurements in the hydrodynamic flow lab. Area 1-120 consists of three liquid rocket stands, with five firing positions, a control center and various support facilities.

Contact Information

For additional information, visit the AFRL's Propulsion website at <http://www.wpafb.af.mil/afrl/rz/> or contact the 88 ABW Public Affairs Office by phone, 937-522-3252, or email, 88abw.pa@wpafb.af.mil

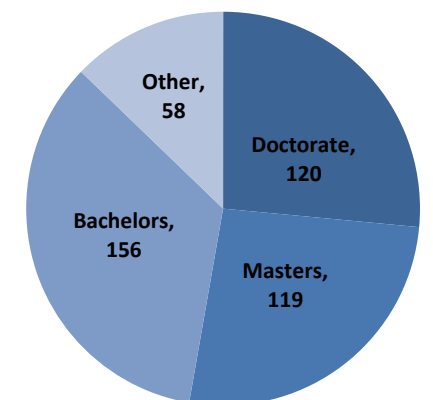


RZ Sites

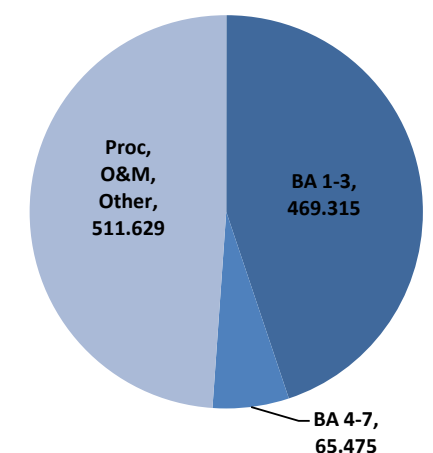


- ★ Wright Patterson AFB, Ohio
- ★ Edwards AFB, California

Human Capital 2010 (total Number)



Budget FY09 (\$ Millions)



Thank You

The Defense Laboratory Enterprise and Dr. John Fischer, Director, ASD(R&E) Laboratories Office, would like to thank Diligent Innovations for their effort in compiling and aligning the information contained in this booklet and Undercover Printer for designing the graphics and publishing the booklets.



www.diligentinnovations.com



www.undercoverprinter.com



